MORE ARISTOCRATS *of The* GARDEN

ERNEST H. WILSON

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More Aristocrats of the Garden

BY

ERNEST H. WILSON, M.A., V.M.H.
Keeper of the Arnold Arboretum of Harvard University

Author of
Plant Hunting, America's Greatest Garden,
Aristocrats of the Garden, etc.

WITH FORTY-THREE ILLUSTRATIONS
MOSTLY FROM PHOTOGRAPHS TAKEN BY THE AUTHOR

1928
THE STRATFORD COMPANY, *Publishers*
BOSTON, MASSACHUSETTS

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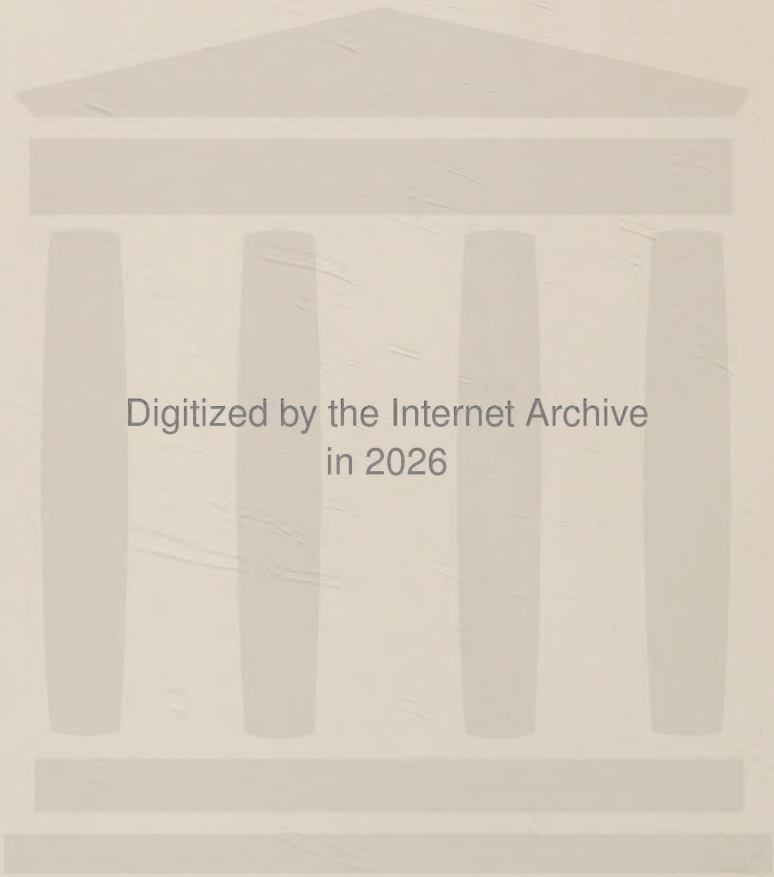
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PREFACE

THIS new work is frankly what its title indicates and is complementary to its predecessor, *Aristocrats of the Garden.* The information contained in that book was general; this is specific in character. It deals definitely with many phases of gardens, gives details of how, why and when. It discusses certain of the larger and better known groups of shrubs and trees, indicates their uses, special and general, tells how they should be planted to insure the best results and how they may be increased. The essence of the science and practice of pruning, planting and caring for woody plants is set forth in the Prologue to *Aristocrats of the Garden* and it has not been thought necessary to repeat it here. Nevertheless, these matters are briefly touched upon in several of these essays, whenever there is any peculiar or special necessity to do so.

Books that represent the product of experience take years to assemble for tested truths only may be set down. Every plant mentioned in this work has been known to me ten years, many for twenty-five; not a few it has been my proud privilege to discover

and introduce from the Orient. I have earnestly endeavored not to let enthusiasm influence judgment. The appraisals are calm and deliberate and faults as well as virtues are revealed. The Arnold Arboretum has been the main testing station, but I have drawn on my knowledge of gardens elsewhere in America, Europe and other continents. No one garden or person has a monopoly of success. All have their limitations and their failures. Only breadth of experience can produce a rule, although intelligent appreciation of facts is ever a wholesome guide.

In 1917 my *Aristocrats of the Garden* was published. Its mission was to direct attention to the best material available and suitable for American gardens. The scope of the work was, of necessity, general in character. Eleven years ago the gardening public was limited, inattentive and much less informed than it is today. The garden club movement was in its infancy. The appeal for the best to be planted in American gardens was as the voice of old echoing in the wilderness. The book fell largely on barren soil and passed out of print.

Wedded to the ideal, firm in the belief that gardens complete if not actually found homes, keenly appreciative of the growing strength of the garden club

movement, I secured the rights of my moribund work, made additions and changes and caused a second edition to be issued in 1926. Its reception has at least justified my faith.

Trail-blazing is never an easy task but it is an essential one and I propose, until fate decrees otherwise, to pioneer onward as I have done since 1899. Introducing new plants is not in itself final or sufficient. Time must prove them of quality, superior and desirable, and means must be found of placing them in the gardens where they belong. The more widely they are known and cultivated, the more pleasure they give to others, the greater the satisfaction to those who cull them from distant lands.

Acclimatization of new introductions and studying their behavior to give sober appraisal of their merits involves many years. Education of the flower-loving public, and, the even more difficult individuals, hard-headed nurserymen, whose business it is to propagate and disseminate plant material, must be pursued without relaxation over long periods. To establish the best of plants on their proper footing in the world of gardens one must watch over them, work for them, fight for them if needs be with tongue and pen even as one would for his children.

Disappointments are many, but these must be accepted as part of the game. Despair results in failure, whereas steady faith ultimately leads to the goal. My experience is that, if new plants have real merit they win for themselves, sooner or later, the place they are entitled to in the flower-lover's esteem. In life's struggle there is always room at the top for those who win, so, in gardens, there is and always will be a place for the best. The Aristocrats of which I tell are assured of rightful places as knowledge of their qualities spreads.

Let no reader imagine that the field of shrub gardening, much less the subject of Aristocrats, is exhaustively dealt with. Many shrubs are not even mentioned in this volume. Probably the future will see yet another complimentary volume. In gardening there is no such thing as finality. As the years bring new experiences the sum of knowledge is increased and expanded and the facts accumulated require to be set down so that they who garden may benefit. But, leaving the future to the care of its very competent self, *More Aristocrats of the Garden* is sent forth in the fervent hope that it serves to make known more of what is best among woody plants for American gardens. If it aids those who love the

beautiful in tree, shrub and vine in providing themselves with richer and better variety, the purpose for which it is written will have been fulfilled.

—E. H. W.

Arnold Arboretum,
March 1, 1928.

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More Aristocrats *of the* Garden

MORE ARISTOCRATS OF THE GARDEN

PLANTS FOR FOUNDATION PLANTINGS

A CRITICAL SURVEY OF AVAILABLE NARROW-LEAFED EVERGREENS

FOR Yews and low-growing Junipers there is great demand and for this building booms are in no small way responsible. These plants together with Mugho Pine, Arborvitae, and Retinisporas are in request for foundation plantings and no architect's plan seems to be complete without their inclusion. Against walls and windows and leading to the doorways they figure on the builder's plans as scrolls of vegetable solids. The idea is good and one should be thankful that architects in their scheme of things recognize the necessity of any sort of living plants. Unfortunately the designs are all too frequently poorly executed. The material, usually that most easily and cheaply obtainable, is very often of the wrong kind and almost always it is far too thickly

planted. More often than not the effect desired could be obtained with half the material used and not infrequently with a quarter. To dealers this type of planting is a profitable business but to the lover of plants it is sad waste. It is not supposed that anything said against the system will have the slightest effect but the soaring prices may sooner or later amend the pernicious practice of crowding three plants where one would be ample.

The object of foundation plantings is to give a finish to the building and harmonize the whole with the surroundings. This is laudable. For this purpose narrow-leafed evergreens are in most instances the best possible material but no Fir, Spruce, Hemlock or Pine, other than dwarf sorts, should be used and neither should tall-growing varieties of Junipers, Arborvitae or Retinisporas. Haste, the order of the day, enters into everything and often disastrously. Foundation plantings give the finishing touch to buildings and declare them ready for occupancy. If such be their sole object then nothing more need be said for certainly they act as ready bait to trap the unwary. These crowded plantings finish the picture, also, they finish themselves. With no room to breathe much less to grow the process of slow death by suffocation and starvation commences the very

day the planting is completed. Good advice to those who go to live in a house furnished with the usual foundation thicket is forthwith to remove half the plants and so give the remaining half a chance to live.

Conifers with their small and persistent leaves require pure air and are ill-fitted for planting in cities and towns where the atmosphere is laden with smoke and deleterious gases. Suburban conditions are less baneful but to flourish Conifers need the pure air of the country. Tall Silver Fir, Spruce, Hemlock, and Pine are first to resent town conditions. The Arbor-vitae, Retinispora and Juniper clans are more resistant but the struggle is always a losing one. The Yews withstand better than anything else of the narrow-leafed evergreen class and should be much more extensively planted.

The Yew in its several species is found wide-spread in the temperate regions of the northern hemisphere. In this country grow three species but only the Canadian Yew *(Taxus canadensis)* is really common in cultivation where it is not altogether a satisfactory plant for it turns yellow-brown in winter. To those of English descent there is no tree more venerated than the common Yew *(T. baccata)* which furnished the bow which in chase and war our ancestors

made famous. As souvenirs of a period when gunpowder was unknown magnificent old Yew trees may be seen in churchyards throughout the length and breadth of England. Under long cultivation many varieties have arisen and this Yew in its various forms is one of the most common evergreens. Where it can be grown in this country no other plant of its class is better, but in northern New England it suffers during the winter. In the Arnold Arboretum a form named *repandens,* low-growing and wide-spreading with the blackest of green foliage, is the one exception. This, in more than thirty years, has never suffered any discoloration, but owing to its low stature it is usually partly buried beneath the snow, and in winter the value of its restful foliage is largely lost.

Some sixty-five years ago a Yew *(T. cuspidata)* was brought to this country from Japan only to be ignored and neglected until comparatively recently. This need occasion no surprise for the love of garden-making in America is of recent origin though happily now waxing greatly year by year. This Japanese Yew was indifferent to contumely and by virtue of its hardiness gradually won recognition. In the nineties of last century writers began to draw attention to its merits which little by little became established

DWARF JAPANESE YEWS, TAXUS CUSPIDATA DENSA AND NANA

in public estimation. Nurserymen were attracted to it and its propagation began. But it takes years to raise in quantity from cuttings Yew plants of saleable size and even today stock is decidedly limited. Many times during the last five years I have heard nurserymen express deep regret that they had not begun its propagation in earnest a quarter of a century earlier. The Japanese Yew has proved its right to the title of the hardiest of all Yews and is perfectly happy in the coldest parts of New England northward to Ottawa and also in much of the Middle West. The original plants were from Japanese gardens and doubtless had their origin in cuttings. All the plants propagated from them and their descendants are broad bushes more or less wide vase-shape and some of the best are fifteen feet high and much more across. Here and there a few have developed leaders and are preparing to grow into trees. A couple of sports have originated; one *(densa)* a low, compact mass, the other *(nana)* a broad shrub irregular in outline and rich in character. There is also a low form with gold-tipped leaves *(aurescens)*. In a wild state the Japanese Yew is a fine tree sometimes seventy feet tall with wide-spreading branches and a trunk ten feet in girth clothed with handsome red-brown peeling bark. Seedlings usually assume

a tree form but vary a good deal and if this Yew be raised in quantity without doubt it will prove as prolific in different forms as its European relative.

For any and every purpose in which evergreens are required the Japanese Yew can be recommended. For placing beneath windows, for flanking doorways, as specimens on the lawn or in the formal garden and as a hedge-plant there is nothing better. Perfectly hardy, immune from disease or pest, accommodating to an extraordinary degree, withstanding shade or full sunshine, black-green at all seasons of the year, small wonder that the plant has been acclaimed Japan's greatest gift to the gardens of the colder parts of North America.

Until just recently American gardens knew only the three species mentioned but now races of hybrids have appeared. Yew plants as a rule bear flowers of one sex only but they seem to court companionship and the result is chance hybrids. The first of these to be recognized originated in a batch of seedlings raised in the nursery of Isaac Hicks & Son, Westbury, Long Island, and is presumably the offspring of the Japanese and Irish Yews. It is columnar in habit with perfectly erect branches, radially arranged leaves but with the dark foliage and cold resistant qualities of its Japanese parent. It is a fast-growing, very

hardy and most useful plant for which a great future is assured. *Taxus media* var. *Hicksii* is its name. The type of this hybrid race was raised in the famous Hunnewell Pinetum at Wellesley, Mass., by T. D. Hatfield, the competent superintendent. In this Pinetum is a collection of all the varieties of Yews which can be grown in the climate. For more than twenty years Mr. Hatfield has been gathering the seeds and raising plants. As a result of his labors a whole series of new forms have originated. The typical *T. media* is intermediate between the Japanese and European species and forms a broad pyramidal bush with spreading branches. A form of compact, conical habit with ascending branches and radially arranged leaves has been named var. *Hatfieldii*. Another form of very dense habit and conical in outline has been named var. *Brownii* by the raiser. This hybrid in all its forms is perfectly hardy in northern Massachusetts and promises to rank among the most valuable plants ever raised.

Another hybrid gardens owe to the vigilance of Mr. Hatfield is a natural cross between the Japanese and Canadian Yews which has been named *T. Hunnewelliana*. This also is intermediate between its parents in habit of growth, in color of foliage and in general appearance. It is perfectly hardy and of ele-

gant form but in the winter the clear green of its foliage is masked by a yellow-bronze pigment. I like the plant very much but it has not the all-the-year round garden value of *T. media.*

Among the Junipers are many low-growing varieties of exceptional merit. Nearly all the types of coniferous growth can be found among the Redcedar. *(Juniperus virginiana),* ubiquitous in the eastern half of North America, though most of the forms are inclined to be tall, narrow columnar trees. A popular form of the Redcedar is var. *tripartita,* a spreading bushy plant of irregular fountain-like habit, seldom more than seven feet high but of greater breadth, and densely clad with slender branchlets. More gracefully spreading and less tall is var. *Kosteriana* with plumose dark green branchlets and a worthy ornament in any garden. The variety *reptans* is a low-spreading shrub with bright green branches and slender curving branchlets, and the var. *globosa* is a dwarf compact sphere of bright green.

The Asiatic counterpart of the American Redcedar is *J. chinensis* also prolific in forms of all habits of growth. One of the most popular is var. *Pfitzeriana* of gray-green hue, more or less vase-shape or broad pyramidal with horizontally spreading branches. Also there is a dwarf globular form

(globosa) with dense, thickish branchlets crowded with dark green scale-like leaves and a form of this tinted golden yellow is named *aureo-globosa.* The variety *japonica* has lance-shaped prickly gray-green leaves and boasts forms variegated with golden yellow. These are low shrubs of compact habit, very common in gardens but apt to become unsightly through branches dying for no apparent reason.

Well-known and appreciated is the Savin *(J. Sabina)* hardy far north into Canada and of which there are also several varieties. The best perhaps is var. *tamariscifolia* of procumbent and ascending habit and needle-shaped bluish green foliage.

The low-growing Sonare *(J. procumbens)* with all its leaves lance-shaped is one of the most common plants in Japanese gardens and is also much planted in this country. It is happiest among cool damp rocks or over-hanging water. In dry situations it is addicted to that vicious pest, red-spider, and is also very apt to develop dead wood. A better plant for this country is *J. squamata* similar in habit of growth and foliage and rich green or bluish green in hue. This is a very variable plant and some of its forms are large forest trees. The type, however, spreads into broad thickets and is anything from one to three feet high. A new and handsome variety is

Meyeri, the Fish-tail Juniper of north China where it is a favorite garden plant. It is of sturdy upright habit with zig-zagging, ascending branches and tufted branchlets forming a dense plume. The leaves are blue-green suffused with white and give a powdered appearance to the whole plant. This Juniper is a real acquisition rich in character and one hopes that it will retain a vigorous habit.

The Junipers are too numerous and variable for anything like exhaustive treatment but one must not omit *J. communis* var. *depressa* so abundant, thrifty and happy in the most rocky and poorest of North American soils. The most common form is round and platter-like in habit with the branches ascending and radiating on all sides from a common centre. In open places these circular patches are wonderfully regular in outline and from three to nine feet across. When crowded by other woody plants the growth is taller and much less regular. The leaves are prickly, narrow lance-shape, concave with a broad white line above and dark green below. In the winter the green is masked by a yellow-brown pigment and the white lines become more conspicuous. A circumpolar variety is *montana* with broad incurving leaves and spreading branches seldom more than two feet high. High up on the

mountains of northern Japan grows the variety *nipponica,* a low-growing plant with relatively broad leaves, particularly valuable for rockeries. It was my good fortune to introduce this plant into the Arnold Arboretum in 1914. It propagates readily from cuttings and when better known will be in great request. There are other dwarf forms including one *(aurea)* which has the young growth golden yellow turning green the second year and altogether a very cheery shrub. The common Juniper in its varied forms will flourish in the stoniest of soils but like all Junipers it demands good air drainage and is never happier than when fully exposed to the wind's full blast.

Retinisporas and Arborvitaes are cheerful, attractive evergreens of greatly diversified form and coloring and vary in height from a couple of feet to forest trees two hundred feet tall. In foundation plantings these furnish not only vegetable solids but also essential reliefs. They thrive in any good garden soil but prefer a deep, cool loam, and they love pure air. In their juvenile stages the parent species are pyramidal or columnar masses of green but later give rise to spreading tabular branches, form a handsome trunk and a broad, flattened or dome-shaped crown. In this adult stage they are splendid for wide open

spaces but useless for the immediate vicinity of houses. Fortunately there are scores of varieties and forms of these plants of permanently low habit and it is these that naturally are most in demand.

Properly speaking the Arborvitaes are all referable to the genus Thuja of which *T. occidentalis* of northeastern North America, and *T. orientalis* of the Orient are the oldest cultivated and the most prolific in forms. The Retinisporas belong to the genus Chamaecyparis, native of North America, Japan and Formosa. The two Japanese species *(C. obtusa* and *C. pisifera)* with the western North American *C. Lawsoniana* are by far the most protean. As a matter of fact it is to these five species that the names Arborvitae and Retinispora, in common usage, apply, but these names are loosely used, are more or less interchangeable and are applied rather indiscriminately to juvenile forms of all five. As a rule, however, nurserymen reserve the name Retinispora for the two Japanese trees, that of Arborvitae for the two Thujas and call the other Lawson's Cypress.

It is the extraordinary variability of these trees when raised from seeds that has given them such a large place in nurserymen's lists and in gardens generally. Many of these varieties retain their peculiar characters for a great many years and some perma-

HATFIELD'S HYBRID YEW, TAXUS MEDIA HATFIELDII

nently so. They are easily propagated from cuttings or by grafting and their forms are legion. There is indeed plenty to choose from, but the names are sadly confused and intending purchasers are strongly advised to visit nurseries and select for themselves. Forms of narrow pyramidal, columnar and globose shapes are found among both Arborvitae and Retinispora and so, too, are forms with bluish gray foliage and yellow and white variegations. In both types forms with hanging whip-like branchlets occur and they have other features in common, but each group has pecularities of its own. Perhaps the greatest difference is seen in winter when the Arborvitaes turn a yellowish brown but Retinisporas change color scarcely if at all. This changing to yellow-brown in winter is not due in any way to disease but is a natural characteristic; the plants develop a protective pigment that masks the green coloring matter during the cold season.

For the colder parts of this country, forms of the American Arborvitae *(Thuja occidentalis)* are very satisfactory and there are varieties in abundance to choose from. The type itself is a narrow, more or less columnar tree of slow growth, compact in habit with bright green foliage from spring to late fall. At maturity it sometimes grows as tall as eighty

feet, and should therefore be planted at a distance from the house. Of much less height and of denser habit is the variety *robusta,* more generally known as *sibirica, tatarica, caucasica* and *Wareana.* This, the so-called Siberian Arborvitae, is the most desirable of the narrow pyramidal or columnar forms with wholly green foliage. Extremely hardy, it is invaluable as a relief in foundation plantings and is splendid for making hedges. It has stouter branchlets than the type, and for gardens in cold parts of this country there is no more useful or reliable evergreen of pyramidal habit and moderate height.

Another excellent green form but taller growing is var. *fastigiata,* the Pyramidal Arborvitae which is sold by many nurserymen under the name of *columnaris.* Very distinct is Douglas' Pyramidal Arborvitae (var. *Douglasii pyramidalis*) of dense pyramidal form with short, copiously divided fern-like branchlets crested at the ends. Another excellent sort is var. *Buchananii,* a graceful columnar tree of moderate height with slender branches, rather distantly placed and irregularly arranged thin branchlets.

Of forms distinguished by their color there are many with yellow and white variegation which are well worthy of a place in the garden. Two of the

best, with white coloring, are var. *alba,* better known as Queen Victoria, and var. *argentea,* both of pyramidal habit and medium height. In *alba* the tips of the branchlets only are white, whereas, in the other whole branchlets are silvery white. Another good sort is var. *columbia* of stronger habit, broader foliage and beautiful silvery variegation. With yellow variegation, var. *lutea,* the George Peabody Arborvitae, is good, being pyramidal in form and having bright yellow foliage. So, too, is var. *lutescens* which is a form of the var. *robusta* with bright to deep yellow foliage. Other good yellow sorts are varieties *Vervaeneana, Douglasii aurea, semperaurea* and *aureo-variegata.*

A curious bush form with long, slender, sparingly ramified branches nodding at the tips and clothed with sharp-pointed leaves is var. *filiformis.* Somewhat similar but with two types of leaves is var. *Ohlendorffi,* better known as *Spaethii.* Another oddity is var. *spiralis* which has compact upright branches and close-set short branchlets more or less spirally arranged. The most pronounced weeping form is var. *pendula* with branches bending downward and rather tufted branchlets.

Old favorites of globose habit are varieties Little Gem, *Woodwardii, globosa, compacta* and *umbra-*

culifera, which are dense masses of growth broader than high. An odd form is var. *Ellwangeriana,* the Tom Thumb Arborvitae, a low, broad, pyramid set with slender branches and clothed with two forms of leaves. Lastly mention may be made of var. *ericoides,* the Heath Retinispora of nurserymen. This is a dwarf, globose or broad pyramidal form with slender branchlets clothed with needle-shaped, soft, spreading leaves, dull green above and grayish green beneath.

The above by no means exhausts the list, for more than fifty forms of the American Arborvitae have received names. Among these are varieties suitable for nearly every situation in a northern garden, and it is the forms of this plant that in their class are the most all-round useful for the gardens of New England, northern New York and lower Canada. They lend themselves to such a variety of purposes that they rank as indispensables in garden-making.

Less hardy but more flexible in constitution is the Oriental Arborvitae *(T. orientalis)* which also exhibits wide variation in form. Scarcely hardy in Massachusetts, it thrives at Rochester, New York, and in places farther west where the winter temperatures are not subject to rapid fluctuation. In Florida and California it is ranked among the indispen-

sable evergreens. The amount of heat this tree can stand is remarkable. I have seen it in the gardens of the Taj Mahal in India looking as happy and cheerful as in its native land of north China.

As a young tree, and one hundred years is still youth with this long-lived evergreen, it is distinguished by its broad, columnar habit, ascending-spreading branches and vertical branchlets forming flattened erect spears of bright green. It has given rise to very many forms simulating in character those of the American Arborvitae. There are white and yellow variegated forms, dwarf forms, narrow and erect forms, and others of weeping habit. Among the best are varieties *aurea, semperaurescens, stricta, elegantissima* and *flagelliformis,* sufficiently described by their names. A globose, compact, bright green form of low growth is var. *Sieboldii.* Another variety is *meldensis,* a more or less columnar plant with needle-shaped bluish green leaves and of quaint appearance.

In China this Arborvitae has been cultivated from very early times and the fruit, the leaves and the inner bark all have medicinal uses. In former times the tree distinguished the gardens of princes and sheltered the tombs of emperors, today it is most commonly met with in gardens and burial grounds.

Throughout the New Year festivities, sprays of this fragrant evergreen are used to symbolize long life, happiness and prosperity.

A newcomer is the Korean Arborvitae *(T. koraiensis)* which I sent to the Arnold Arboretum in 1917. This varies in habit from a low groundcover to a slender tree thirty feet tall. It makes a lovely low tangle of green under the shade of other trees and herein lies its usefulness to gardens. Its habits are similar to those of the Canadian Yew *(Taxus canadensis)*, loving moist rocks and the margins of woodland streams. Its branches when growing freely suggest Fern fronds and the underside of the leaves are marked with white. I am glad to say that this waif from the Hermit Kingdom has taken kindly to America's climate and promises to be a useful addition to our gardens.

The Retinisporas, compared with the Arborvitaes are comparative newcomers to western gardens. We owe our earliest varieties to Dr. George R. Hall who sent them here from Japan in 1861; in the same year John Gould Veitch introduced them into England. Their beauty won them friends from the day they were first seen and their popularity has increased ever since. And rightly so, for they are among the most hardy and beautiful as well as the most diversi-

fied of evergreen plants. For this heritage we have to thank the Japanese with whom they have been favorites for centuries. With a keen eye for differences in form and habit, the Japanese have garnered a host of forms of these Retinisporas the best of which are now familiar plants in western gardens. The parent species *(Chamaecyparis obtusa* and *C. pisifera)* are among the loftiest trees of the forests of Japan and furnish timber of great value. Both species are highly ornamental and perfectly hardy in New England and are most desirable evergreen trees. Since they grow to be fully 150 feet tall they should be given plenty of room. The species are not plants to use for foundation plantings although among their offspring are found some of the most pleasing and most useful for this type of work. Though they grow taller than the globose forms and broader than the pyramidal forms of the American Arborvitae, they are really superior as garden features. They possess more grace and more character and are richer in decorative qualities. Winter does not dull the beauty of their coloring and at any and every season of the year they are good to look upon. They bear clipping well and will live on little food, as witness the dwarfed specimens in pots for which Japan is famous. When these Retinisporas attain consider-

able age they do lose in quality of form, but for fifty years they may be counted reliable in every way, yielding not in beauty of appearance to any of the lesser evergreens. The varieties are very numerous and it is not my intention to mention all but merely to select the more characteristic.

My own favorite dwarf Conifer is *Chamaecyparis obtusa* var. *nana,* and every inch an aristocrat is this pyramid of dark green with its flat, short, spreading branches and crest-like branchlets. Slow of growth and distinct in appearance, it has won for itself a foremost place in gardens where quality rules. A sport from it known as var. *pygmaea* is exceedingly dwarf with almost creeping branches and is ideal for rockeries.

Taller growing forms are varieties *albo-spicata, aurea, gracilis, gracilis aurea, erecta* and *magnifica* whose names describe them. And very beautiful is var. *Crippsii* with pale yellow foliage and loose, graceful, pyramidal habit.

The other species *(C. pisifera)* has given rise to even more forms. Handsome and distinct is var. *plumosa* of dense conical habit, ascending branches and slender feather-like branchlets. It has spreading awl-shape leaves and the whole character of the plant is plume-like. There are pleasing forms of the

Plume Retinispora with silvery *(argentea)*, yellow *(aurea)* and sulphur-color *(flavescens)* tipped branchlets. A remarkably distinct variety is *squarrosa*, the Moss Retinispora, a bushy plant of good size with spreading, feathery branches and silvery gray leaves, narrow and spreading. The whole plant suggests from a distance a gray billowy cloud. A form of this with yellow foliage is known as var. *squarrosa sulphurea*. A great favorite is the lovely var. *filifera* with pendent, thread-like branches, slender and much elongated. A sport with yellow foliage is var. *filifera aurea*. Both grow into mound or hummock-like masses, broader than tall. All these Japanese Retinisporas are almost if not quite as hardy as the American Arborvitae and throughout the winter give richer color effects.

Where the Lawson Cypress *(Chamaecyparis Lawsoniana)* can be grown, and that is in places warmer than New England, a wealth of forms is available. The type is native of Oregon and northern California where it grows two hundred feet tall but there are forms of all sizes down to a few feet. The branches are bright to grayish green in hue and more or less plumose in character. Some types are variously variegated with white and yellow and some are blue-green; many are columnar, others are spreading and

compact and some have pendent branchlets. In all, more than eighty forms have received names.

This account is far from complete but it must not close without mention of the Mugho Pine *(Pinus mughus)* deservedly one of the most popular of low-growing Conifers. It is very variable and a number of forms can be found in our nurseries varying in height and density of growth. All are of spreading habit and admirably suited for foundation plantings, for isolated specimens and, indeed, for any and every purpose required of low-growing evergreens.

PLANTS FOR TOWN-HOUSE GARDENS

EARLY BLOSSOMS UNDER INIMICAL CONDITIONS

CITY conditions are most inimical to plant life. The air is laden with soot and deleterious gases; harsh winds bluster through the streets and draughts prevail everywhere. These disadvantages notwithstanding, there are quite a number of plants which will thrive in the town garden. Now, by town gardens is meant the small area of land attached to the houses of those who merely winter in the city and return to their country homes in the spring. Such plots are usually small in area and only an odd plant or two can be accommodated. More often than not iron railings take the place of hedges and only a few feet of ground within separate the street from the house.

The observant will have noted how very green is the grass on town lots in the early spring. The copious dressings of soot, which it gets from every storm and foggy day, are evidently much to its liking. A tiny patch of lawn can be had in nearly every town garden and to nestle in it, or beneath the walls of the house or side of the steps that lead to the doorway,

early flowering bulbs may be planted. In spite of the draughts which prevail in the streets the walls of the house afford warmth and protection to bulbs causing them to flower in advance of their brethren in open borders. In a sheltered nook a clump of Winter-aconite *(Eranthis hyemalis)* will often expose its yellow blossoms in late January or February. So too, will Snowdrops, Grape-hyacinths, Squills and Glory of the Snow, all of which flower to perfection. If the house is occupied late enough in the spring Tulips and Double Daffodils should also find a place. These early flowering bulbs, these harbingers of spring, are ever welcome and seem born to cheer and remind us that winter is but a brief season of the year.

In addition to the bulbous plants an odd bush of some early flowering shrub may be accommodated. Of course, everything depends on the size of the town garden, but where a garden is possible at all a place can be found for an odd shrub. First, if there be space, I recommend the Witch-Hazels, which have the distinction of being the last shrubs to blossom in the autumn and the first to put forth their flowers in the spring. Indeed, it is sometimes possible to find flowers on the common Witch-Hazel *(Hamamelis virginiana)* at Christmas and opening buds on an-

CHINESE WITCH-HAZEL, HAMAMELIS MOLLIS

other American species *(H. vernalis)* early in the new year. The flower buds in all the species are formed early in autumn and are strung along the stems in clusters, each of which singularly resembles the pad of a pussy's foot. They are good shrubs for planting in close proximity to the house and they do not object to smoke, dust or winds.

A better specific name for *Hamamelis vernalis* would have been "Hiemalis" since it flowers in the winter rather than in the spring. This is a shrub with upright branches, growing from five to eight feet tall, and suckering freely from the base forms a broad clump or thicket. The Vernal Witch-Hazel has smaller flowers than the other species but is the most floriferous of them all. The curiously jointed strap-shaped petals are contractile. It has blossomed in the Arnold Arboretum as early as January 6 and at any time during that month a warm spell of weather will cause the blossoms to open. If the temperature falls suddenly the petals contract and infold. On the appearance of mild weather they open and with falling temperature fold up again. It is rather interesting to watch the game of hide and seek the petals of this Witch-Hazel play with Jack Frost. The typical plant has light yellow petals, reddish towards the base. There is another form, not yet

named, of which the petals are deeply suffused with reddish brown. Another variety, *tomentella,* has leaves more densely hairy and glaucescent on the under surface. For its abundance of blossom and its early flowering qualities this Witch-Hazel ought to be freely planted in the town gardens of New England. The flowers emit a delightful spicy odor of almonds.

The Japanese *H. japonica* is similar in habit to *H. virginiana* and grows to an even larger size, being sometimes twenty-five feet tall and as much in width. The flowers are larger and more abundantly produced than is usually the case in the common Witch-Hazel. It blossoms early in March and in the type the petals are clear yellow with the cupped sepals usually purple on the inside. A variety, named *arborea,* is of tree-like habit with golden yellow petals, the calyx deep purple on the inside and purple-anthered stamens. Another variety, *Zuccariniana,* also of tree-like habit with the branches more ascending than in the type, has lemon-yellow petals and the calyx greenish yellow within.

The Chinese species *(H. mollis)* is the best of the family for it has the largest flowers with broad petals, deep yellow except at the base which is reddish. The leaves are strongly veined and densely clothed with

soft woolly hairs on the underside. It is native of the Yangtzse Valley region of east-central China, being common in open woods and thickets from the Hupeh province eastward. All the Witch-Hazels are hardy and may easily be propagated by grafting on *H. virginiana.*

Certain of the Asiatic Magnolias do remarkably well in town gardens — the Star Magnolia *(Magnolia stellata),* the Yulan *(M. denudata)* and the pink-flowered *M. Soulangeana* in particular. In their different forms they all may be had in perfection of blossom in March and April. It is very remarkable that these Magnolias should thrive in the city limits. Long cultivated in the Orient, it would seem as if they had adapted themselves to man's habit of living in crowded places. In the spring when the large, cup-like chalices of these plants crown every shoot they are a pleasing sight in Boston, Massachusetts, and other large cities. No other plant with such large blossoms can be grown in New England.

The Chinese Almond *(Prunus triloba)* with its double, deep pink, rose-like flowers studding the branches is another glorious shrub for town gardens. This may be either grown as a bush or espalier fashion against a wall. The Goldenbell (For-

sythia), where there is room, is also admirable for town gardens. The best is the hybrid *F. intermedia* var. *spectabilis,* but as a curtain over the fence or trained against the house the old-fashioned *F. suspensa* is hard to beat. The winter-flowering *Jasminum nudiflorum* is also a good plant for training against the house and should be much used from Philadelphia south. In New England towns enthusiasts may enjoy their fancy for Azaleas by planting *Rhododendron mucronulatum* in some nook or corner. This will give a wealth of rose-pink blossoms ere March is spent. The fragrant Mezereon *(Daphne Mezereum),* its rigid erect stems densely clustered with rose-pink blossoms can be had in flower about the same time. There are other plants but a selection of the above, according to size of garden, will give flowers from the new year until it is time to shut up the town house and hie for the country home.

City conditions are more harsh on evergreen plants than on those which lose their leaves, indeed, very few can be induced to grow. Best of all is the Yew—in New England the Japanese Yew *(Taxus cuspidata)* and in warmer districts farther south, the English Yew *(Taxus baccata)* in their different forms. These Yews may be so employed as to fur-

STAR MAGNOLIA, MAGNOLIA STELLATA

nish gardens of all sorts, sizes and descriptions with material beautiful at any season of the year. Where the climate is milder than that of Massachusetts and where the atmosphere is not overburdened with soot the common Box may be had as a rounded, hummock-like mass or as a low edging. A more hardy plant than Box, which can be used as a groundcover as a screen against the walls or as a low hedge, is *Evonymus radicans* and its variety *Carrieri*. Similarly, the common Ivy can be used as a groundcover and as a screen against or over the porch or doorway. The hardiest of the Ivies is that known as *Hedera Helix* var. *baltica*.

Usually iron fences perforce take the place of hedges in the city. Where it is possible to have a hedge the Privets are usually in request. They do very well and, always supposing that the variety planted is hardy and that the plants are kept trimmed in such manner that they are broadest at the base, they are excellent. The Japanese Yew makes the finest of all hedges and withstands the wear and tear of city conditions better than any other evergreen. Where the climate is mild the European Holly *(I. Aquifolium)* and the Japanese *Osmanthus Aquifolium* make excellent hedge plants in the city. This is very surprising when one remarks that these are

broad-leafed evergreens. They have, however, a very tough and leathery leaf, which seems to enable them to grow under the most adverse conditions. In the heart of London, England, where city conditions are about as extreme as anywhere in the world, a visitor will note in Chelsea, Battersea, Hammersmith and other crowded areas hedges of this Holly and Osmanthus. In America neither of these can be thought of north of Washington, D. C.

Of course, for town gardens in climates warmer than New England a greater variety of plants is available. The same is true for country gardens where the atmosphere is less vitiated. The primary purpose of this essay, however, is to indicate a few plants that can without difficulty be made to flourish under the most severe conditions of city life. It is written with particular reference to such cities as Boston, Chicago, New York and Philadelphia. Cities like Hartford, Providence, Rochester and Albany can enjoy a greater variety but what I wish to bring home is the fact that, no matter how small the town garden may be or how inimical to plant growth the atmospheric and climatic conditions are, plants there be that will supply cheerful blossom throughout the late winter and early spring.

PLANTS FOR SHORE GARDENS

TREES AND SHRUBS THAT WILL BRAVE THE STRONGEST GALES

IN GARDEN making by the sea the problem is to find trees and shrubs that will withstand the wind's full blast, carrying as it does more or less salt-laden moisture. Everybody realizes that gales blow from the sea and the high velocity of the wind is common knowledge. This has a dwarfing effect upon vegetation and one has but to stroll a mile or two along the coast to realize this, and note how markedly the direction of the prevailing winds is shown. Until a rampart of protective vegetation is established as a windbreak it is useless to attempt to grow choice herbs, shrubs and vines. The difficulty is greater in the colder regions of the world than in warm temperate and tropical lands. In the tropics Mother Nature in Mangrove, Cocoanut Palm and others, has evolved types of vegetation that will withstand both wind and salt spray. In the warm temperate regions also there are in rich variety trees and shrubs immune to the effects of gale and spray. A great deal of this vegetation is evergreen, the leaves being relatively

thick and capable of withstanding adverse conditions. In the cool temperate regions evergreen trees are almost nonexistent, except the narrow-leafed sorts, what vegetation there is near the cliffs is deciduous and the young growth in the spring is very susceptible to salt air.

For California and the warmer states there is abundant material that can be used as a screen and windbreak for shore gardens, but in New England and other cold parts of the country creating such a windbreak is a very difficult undertaking, for the conditions are severe. But gales and far-flung salt spray, notwithstanding, perseverance can accomplish much and shore gardens protected and filled with the choice plant material can be made. In spite of its harsh and blustering character the sea exercises a moderating influence upon temperature and imparts humidity to the atmosphere. The conditions on the whole are favorable to vegetation. As a matter of fact around the coasts of every country a greater variety of plants can be grown than in places removed from the sea. As illustrating both the retarding influence of winds and the moderating influence of humidity the sea imparts to coastal climates the adage so commonly expressed in Cornwall and Devon is very apt. The people of those favored districts in England declare

that their trees are bushes and their bushes trees. The paradox is both apt and descriptively accurate.

Since in planning a shore garden a windbreak is the first essential it is all important to plant trees and bushes that will withstand gales and salt spray. Their ability to do this must be the first consideration. Where sand dunes, projecting rocks and gullies are found some natural protection is afforded which can be utilized to good advantage. In planting on absolutely naked ground the difficulty is greater and it is a good plan to erect as a temporary windguard low walls, banks of earth or even wattled hurdles. Behind such ramparts the first plantings may be made. It need hardly be stated that small plants only should be set out and that they must stand thickly together for mutual protection. Thick planting of vigorous young plants is the first essential in the establishing of a windguard, for by such means the plants are the better enabled to get firm hold of the soil whilst enjoying the protection of the protecting rampart. Growth as a rule is very slow but each successive row grows higher than the one in front of it so ultimately, if the planting be sufficiently thick and broad, a bank of vegetation sloping upwards from the sea is formed and makes an admirable first line of defence. Such a thicket or bor-

der will not be a thing of beauty but the aesthetic in this case must give way to the utilitarian. Once we have got our protective belt of vegetation making a garden by the sea is simple.

However, before we can establish our first line of defence it is necessary that we know the material suited to the purpose. Evergreens are best for such purposes but alas! the number suitable and hardy in New England is exceedingly limited. The best of all is probably the Austrian Pine *(Pinus nigra* var. *austriaca)* which appears to delight in New England's gales and harsh climate. On Long Island and New Jersey the Japanese Black Pine *(Pinus Thunbergii)* is splendid for the same purpose, further south the Clustered Pine *(Pinus pinaster)* and the Monterey Pine *(P. insignis)* and others may be used. But we had better concentrate on the colder regions where the problem is so great. In New England the native Pitch Pine *(Pinus rigida)* is useful and as an outermost rampart the low growing *P. montana,* of which the Mugho Pine is a variety, can be used to great advantage. The Redcedar *(Juniperus virginiana)* stands up well under the most adverse conditions and should be used.

Among deciduous trees there is greater variety but nothing really better for New England than the Syca-

MARITIME JUNIPER, JUNIPERUS CONFERTA

more of Europe *(Acer pseudoplatanus)*. Along the shores of Narragansett Bay and on parts of Cape Cod picturesque groups of this tree planted long ago may be seen and their effectiveness as a windbreak gauged. Planted thickly they put up a splendid fight against the strongest winds and though their growth is slow and their appearance ragged they are none the less effective. The common Willow *(Salix alba)* and the White Poplar *(Populus alba)* are also excellent plants for shore plantings, but unfortunately, the Satin Moth is now a pest on these useful trees and bids fair to wipe them out of existence. The common Pear *(Pyrus communis)*, the Mountain Ash *(Sorbus americana)* and the White Beam *(Sorbus Aria)* are also very useful trees; Hornbeam *(Carpinus caroliniana* and *C. Betulus)* and the different Hawthorns are also very accommodating. The Larches, including the American, Japanese and European, are all good for such purposes.

As an insurance the more mixed this type of planting and the more thickly it is planted the better. It ought never to be forgotten that the object of such a planting is, first, last and all the time, protection from wind and salt spray. It is not to be expected that shapely specimens will result. On the contrary, the trees will be stunted, gnarled and lop-sided, but

if they provide a living, permanent shield, in the shelter of which choice trees, shrubs and herbs can thrive, they have fulfilled their purpose.

It often happens that the site chosen for house and grounds has but a thin surface layer of soil covering the rocks. In this case it is almost out of the question to establish trees and as a first line of defence one must fall back on shrubs. That there are a good number that will grow under these conditions may be seen by anyone who will take the trouble to traverse a few miles of New England seacoast. Even the most sandy wastes are more or less clad with woody vegetation of sorts. Nearly all this vegetation is deciduous but the Inkberry *(Ilex glabra)* is an exception. This round-topped, twiggy bush is dense of habit and clothed with lustrous dark green leaves. It is about the only evergreen shrub of any size that the colder parts of New England boasts. For trailing over rocks or sandy areas or hanging down over the face of cliffs the Bearberry *(Arctostaphylos uva-ursi)*, with prostrate rope-like stems and dark green evergreen foliage, will grow under very harsh conditions. An excellent groundcover, its little pink urns are bright and cheery in late May and June and its dark scarlet fruits are handsome in the fall. Anyone who has visited Cape Cod must have noticed the

large areas clothed with this plant. It is by no means confined thereto, indeed, it is found well north toward Labrador and it circles the boreal regions of the northern hemisphere.

Were I writing for shore gardens in California or the warm states I could instance scores of evergreen plants that would flourish, such as the evergreen Raphiolepis of Japan, the lovely Escallonias of South America and various Leptospermums of Australia and New Zealand, not to mention the Bottlebrushes (Metrosideros) and the Pittosporums of New Zealand. In Tasmania *Acacia sophorae* binds the sandy foreshores as firmly as does Maram Grass those of Europe. It would be easy to describe a hundred broad-leafed evergreen plants for California shore gardens, but in New England choice is limited.

Certain Evonymus do well by the seashore and from Long Island south, the maritime *E. japonica* in its various forms is a useful plant. This shrub is much used in the south of England for hedges right on the sea front. More hardy and equally useful is *E. patens,* which flourishes around Newport, Rhode Island. Both are evergreen and ought to be used wherever they prove hardy. The common Broom *(Cytisus scoparius),* naturalized on the coast as far

north as Cape Neddick in Maine, does remarkably well by the seashore and in spring is a mass of clear yellow. Although its foliage is scarcely discernible, the green, twiggy stems are attractive. Planted thickly and pruned severely after flowering, this will make an excellent thicket and bear salt spray with impunity.

Heather may be grown on cliffs where there is the thinnest covering of soil, always supposing that lime is absent. This plant is much hardier than is generally supposed and given free exposure thrives merrily. Less hardy but also good for seashores is *Erica cinerea* and, so too, is the better colored *E. vagans*. In parts of Europe, especially in southern England, Broom, Gorse, Heather and Heath make a lovely combination. Gorse *(Ulex europaeus)* is less hardy than the Broom and can be transplanted with success only from pots. Where it will thrive it is not only handsome but is an excellent defense against marauders.

Among narrow-leafed evergreens two Junipers of prostrate habit must be mentioned. One is the Bar Harbor Juniper *(Juniperus horizontalis)*, which makes a dense mat on cliffs. It is either green or gray-green through the summer months and changes to a lovely vinous purple during winter. The other, an

excellent Juniper for sandy regions from Cape Cod south, is the Japanese *Juniperus conferta.* This is essentially a maritime plant and I have seen it covered with sea water at high tide. It has an immense distribution along the Japanese littoral, extending far into Saghalien and will, undoubtedly, be of great value in this country. Though known for a long time, it was not introduced until I sent seeds to the Arnold Arboretum in 1914. It does well on Long Island and is fairly hardy with us.

Turning to deciduous shrubs the colder parts of our coasts are much better off. Up and down the coast of eastern North America there is no more beautiful plant in spring than the Beach Plum *(Prunus maritima)* which is anything from a shrub flattened on the ground to a bush of irregular shape, five or ten feet tall. There is much character to this common plant. Its branches are rigid and intricately placed and when laden with a multitude of pure white flowers the bushes resemble irregular drifts of snow. It ought to be much more abundantly used as an ornamental shrub, moreover, its fruit makes an excellent preserve. In parts of Europe it has a counterpart in the Black Thorn *(Prunus spinosa),* which is similar in appearance but flourishes much further inland. These two Plums could, to advan-

tage, be planted as thickets to brave the elements in any and every shore garden of New England. With them may be associated the common Bayberry *(Myrica carolinensis)* with fragrant foliage and fatty fruits, which are used for making the familiar Bayberry candles.

Among the bushes or small trees well adapted for seashore planting are the Tamarisks of which *Tamarix parviflora, T. pentandra* and *T. odessana* are the hardiest. They are familiar plants, with slender branches bearing in great profusion racemose clusters of pink blossoms. After flowering they should be severely pruned to keep them within bounds. Light, airy and graceful in habit, they are very effective on top of sea walls or in sandy places. The Russian Olive *(Elaeagnus angustifolia)* is also a suitable plant but needs shelter from the strongest winds. Its relatives, the bushy, broad-leafed *E. multiflora* and *E. umbellata* are more satisfactory plants, of denser habit and lower in stature they withstand the gales better. More hardy than any of these is the Silver-cherry *(E. argentea)* and where lime is present this can be used to advantage.

Low-growing and spreading by means of underground stolons, the Aronias form dense masses and in flower and fruit are handsome. Wide-spread in

BEACH PLUM, PRUNUS MARITIMA

eastern North America they will grow in the poorest of soil right on the foreshore. The Sumachs including *Rhus glabra, R. typhina* and *R. copallina,* do well under adverse conditions and in the autumn give wonderful color effects. Several of the bush Honeysuckles, including *Lonicera Morrowii,* with flattened, wide-spreading branches, and the variable *L. tatarica,* can be planted thickly as a screen. Both have pleasing flowers in spring and brightly colored fruits in late summer and early autumn.

In the swampy regions near the sea a Shadblow *(Amelanchier spicata)* is abundant on Cape Cod and elsewhere. This is a bush sending up in quantity erect stems which grow from five to eight feet tall and in spring are laden with pure white blossoms. The common Goat Willow *(Salix caprea)* does well by the sea and in early spring its pussies are a never failing source of delight to young and old. The Red Dogwood *(Cornus sanguinea)* and the Osier Dogwood *(C. stolonifera)* form thick masses and in winter their polished scarlet to crimson stems give color and brightness to the dingiest landscape.

A few Roses find a natural home on coasts, sandy wastes and in swamps. *Rosa virginiana,* the common seashore Rose of New England, is one of the loveliest wildings we boast. Its pink flowers are as

pretty as Roses can be, while its crimson stems through the winter and its scarlet fruits in late autumn are very handsome. It has erect stems, from one to four feet tall, spreads by means of underground shoots and takes care of itself in the poorest of soils. The most widely known and perhaps the best Rose for the seaside is *R. rugosa,* known to the Japanese as the Sea-tomato, a name which intimates both its habitat and appearance of its fruit. There are a good many varieties of this well-known Rose, but none are more handsome than the pure white and pink varieties with single flowers. All the hybrids of this Rose do well and for a low fence nothing is more pleasing than the so-called Carnation Rose, F. J. Grootendorst, with small, fringed, very double, crimson flowers borne in great profusion. In the culture of Rugosa Roses the old canes should be cut clean away giving the new growth a chance to flourish. For trailing over rocks nothing is more lovely than *R. Wichuraiana* with polished, dark green leaves and pure white blossoms; *R. multiflora* does well under similar conditions but forms a more hummock-like mass. The various hybrids of these species are all valuable for shore gardens. The Scotch Rose, *R. spinosissima,* in its different forms

can also be used, so too, can the Sweetbriar *(R. eglanteria)*.

One of the most beautiful of the Viburnums, namely, *V. Carlesii,* is naturally a littoral shrub growing wild among rocks bordering the Sea of Japan. It is too scarce and valuable for massed planting but behind the first line of defence a few bushes should be grown. Where the climate is mild the Laurustinus *(V. tinus)* is one of the very best of all shore garden plants—evergreen, blossoming in the winter, always of compact habit it is a thing of beauty at all seasons of the year.

There are a great many other shrubs that could be mentioned but perhaps enough has been said to show that there is no dearth of woody plants available for shore gardens. The important thing is to plant thickly so as to form, either with trees or with bushes, an outer rampart of vegetation. Such planting will not of itself be beautiful neither will the plants develop into shapely specimens. Their work is to break the winds and if they accomplish this then the next is easy. Behind such a rampart a thousand and one beautiful herbs and shrubs can be grown, often to greater perfection in gardens by the sea than in those far inland. One may have to battle vigorously with the elements but by starting with small

plants, thickly placed, and exercising the necessary amount of patience victory is sure. There is possibly greater fun in making a garden by the sea than elsewhere since it is a fight against nature. Some of the finest gardens in the world are those that nestle behind windguards along the seacoasts.

PLANTS FOR GROUNDCOVERS

LOW CARPETS OF RESTFUL COLOR

GROUND covering plants are an important element in every well ordered garden. That no home is complete without a lawn is a truism and the grasses are among the finest groundcovers we boast. Lawns to be worthy of the name need much attention in weeding, watering, rolling and mowing and only a limited portion of the garden can be given this favored treatment. In other parts plants less exacting than lawn grasses are necessary to hide bare places and furnish restful green and flowers or fruit of attractive colors. For the ground beneath trees, the borders of pathways and open vistas low-growing plants which hug the ground and form a pleasing carpet are in request. Mother Nature—economical yet paradoxically extravagant—provides in abundance plant material for clothing all but the most arid and frigid regions of the globe. The depths of the tropical forests are carpeted with a wondrous miscellany of plants, the open treeless areas of the world with grasses and herbs in great variety, the alpine regions with herbs and low shrubs, endless in species which usually bear

richly colored flowers, the boreal regions of the world with low, trailing stem-rooting plants, many of which are evergreen in character. For we who garden in northern lands these boreal plants of compact habit and low stature have a value beyond price. Nor is their number limited though many are difficult to obtain through the ordinary channel of the nurserymen.

One has but to travel through sandy regions such as Cape Cod, Massachusetts, or wander over the upper slopes of the New England mountains to realize how prodigal Nature is in plants useful for all sorts of odd places in the garden. In shady nooks and beneath Hemlock and Pine how splendidly luxuriate Ferns in rich variety! In moist places beneath trees or on rocks how pleasing is the pure green foliage lit with spikes of tiny white flowers of the Canadian Mayflower *(Maianthemum canadense)*. In gardens beneath Pine and Beech Lily-of-the-Valley flourish finely.

Telling of broad-leafed evergreens in *Aristocrats of the Garden* I have enumerated many useful groundcovers for New England gardens so it is sufficient here to add a few others of proven value. Among the Junipers are several species which furnish perfect groundcovers. None is better than the Bar

Bar Harbor Juniper, Juniperus horizontalis

Harbor or Waukegan Juniper *(Juniperus horizontalis)* which varies from green to gray-green in summer and throughout the winter assumes a lovely violet-rose hue. This plant trails over the ground forming a thick mat. Found wild from northern Massachusetts and Nova Scotia to Montana and British Columbia, this is one of the most beautiful of all hardy groundcovers.

Few woody plants cover so great an area of the world's surface as the common Ling or Heather *(Calluna vulgaris)*, dear to the heart of Scotchmen and a general favorite with everyone. Thousands of square miles of mountain top and moorland in northern Europe are clothed with this delightful plant whose blossoms and tinted foliage make beautiful the landscape in late summer and autumn. Heather is quite hardy in New England and I know of one estate in the northwestern part of Massachusetts where it is naturalized and covers many acres. The secret of its successful culture is to plant it in the open where it is fully exposed to sun and wind. Close cropping with the shears in the springtime helps to form a dense mass and prevents the plants becoming leggy. It readily roots from cuttings and pot grown plants are the best for transplanting purposes. The fact applies to many other trailing plants

including the Arctostaphylos and low-growing Cotoneasters. Of Heather besides the common purple type there are a great many varieties differing in habit of growth, in the color of foliage and of blossom. Among the best one may mention *alba, rigida, Serlei, Alportii, coccinea* and *Hammondii.* A dwarf form with silvery foliage is *argentea;* with bright golden foliage there is *aurea* and the variety *cuprea* has foliage golden in summer and a rich red-bronze in winter. There are many other forms including one with double flowers.

For sunny places, the Sun Roses with their wealth of blossoms of varied hues have much to recommend them. The common *Helianthemum vulgare* is possibly the hardiest of all. There are many forms of this species in cultivation including such as var. *stramineum* with sulphur-yellow flowers, var. *venustum* with crimson flowers and a yellow spot at the base of each petal, var. *mutabile* with pale rose-colored flowers, var. *cupreum* with copper-colored flowers. Another species well worth having is *H. glaucum* which is distinguished by its almost white foliage and rich yellow flowers. Sun Roses are best planted thickly together on a well-drained bank with a southern exposure.

For covering the tops of the boulders or furnish-

BEARBERRY. ARCTOSTAPHYLOS UVA-URSI

ing a patch of snowy whiteness in immediate view from the windows of the house the suffruticose Candytufts can be recommended. Both the early flowering *Iberis tenoreana* and the summer blooming *I. sempervirens* are perfectly hardy as far north as Boston, Massachusetts. As a carpet in the open common Thyme *(Thymus serpyllum)* with its scented foliage is everybody's favorite.

Two excellent plants for border planting which have been largely used in the Arnold Arboretum are the fragrant Sumach *(Rhus canadense)* and Yellow-root *(Xanthorrhiza apiifolia)*. The fragrant Sumach is a densely branching plant with slender stems growing slantingly from one to four feet high, bright yellow flowers on short axillary spikes which appear before the leaves and are followed by red fruits ripening in June. The leaves are three-lobed and in the autumn change to wondrous tints of orange, red and crimson. The Yellow-root does not grow so tall and as it spreads rapidly by underground shoots soon covers the ground with its erect stems. The racemose flowers are small, purple in color and put in appearance with or before the unfolding of the leaf. The leaves are pinnately divided, shining green and change to clear yellow or bronze-purple in the autumn. The growth of the plant is

dense and even in height making a fine sward. It has been very freely employed in border planting in the Arnold Arboretum where it is the finest deciduous-leafed groundcover. Both these shrubs grow rapidly and are not attacked by disease or pests of any kind. They hug the ground, flourish beneath taller shrubs and if they stray beyond the limits intended for them they are easily kept in bounds by use of knife or spade. One other plant useful for similar purposes is *Lyonia mariana,* a low shrub with deciduous leaves and white urn-shaped flowers borne in racemes on the leafless shoots. Although a member of the Heath family this American plant is not particular about soil or situation.

STREET TREES FOR TOWN AND COUNTRY

THE HOW AND WHY OF STREET PLANTING

THROUGH the good sense and foresight of the forefathers, the villages, towns and cities of the older settled parts of this country, and of New England in particular, possess fine shade-giving trees. Nowadays between the forces who wish to cut them down or lop their branches and those who want them left alone, these old trees are a continual bone of contention. Always there is much to be considered on both sides and usually both have merit. Only those with a full knowledge of local conditions and necessities are qualified to decide such questions. Citizens are to be commended for a zealous affection for the tree legacy they enjoy but sentiment must not be a stumbling block in the path of genuine progress.

Our cities and towns have greatly increased in size and the character of many has changed completely since their founding. Manufactories have increased enormously affording employment to hundreds of thousands of people. This has caused a congestion of buildings and a vitiation of living conditions. From the chimneys of these myriad houses and fac-

tories are vomited forth smoke and gasses deleterious to the health of man and trees and, indeed, to life in all its forms.

City conditions have brought into being modern sanitation and its scientific methods with the result that many diseases have been conquered. The value of trees as purifiers of the atmosphere, however, has not yet received full and proper appreciation. Trees absorb the gas carbon-dioxide, poisonous to man and set free pure oxygen, the very life of man's lungs. They do more than this. Trees deaden noises, the curse of the age we live in; they give welcome shade in summer and tend to keep everything within their shadow cool; in winter they break the winds' force and conserve warmth. These are strictly utilitarian reasons for planting trees in towns. Their aesthetic value I will not stress since it is apparent to all who think, yet I would emphasize that good roads, lined with fine trees, have commercial value in that a fair approach adds not a little dignity to any town or city and this can be capitalized.

Thanks to the automobile, this is an era of road-making unapproached in magnitude in the world's history. Many millions of dollars annually are being spent on road-making in this country. It is greatly to be wished that a few hundreds of these

millions were ear-marked for use in lining these new roads with suitable trees. Last August on a hot cloudless day I motored over the so-called million dollar highway toward Buffalo, and how I longed for the shade of a tree! Yes, tree-planting ought to be an essential part of modern road-making and should figure in the estimates of road costs and maintenance. But it is no use planting trees under a line of telegraph and telephone wires and, just when they are attaining that shade-giving size and beauty, cutting the tops partly or wholly off because they interfere with the wires. It is always phrased the trees interfere with the wires, never the wires interfere with the trees which is actually the correct order. The wires belong underground, not above marring the beauty of the landscape as they do. The plea expense is too much heeded but some day a generation will arise that on any such plea will not suffer the present hideous arrangement. We cannot have both real trees and wires paralleling our highways and it's high time the choice was decided. This would be economy. At present much of our street and road-planting is sheer waste of money.

The ideal street tree for town or city is one that will grow anywhere and under any condition flourish. One that never needs any attention in the way

of food, water, air or light, never needs pruning and never resents being mutilated for the convenience of overhead wires or underground cables and if it could contrive to sweep up its own leaves, or, better still, maintain them fresh and green through all seasons and all years so much the better. It does not exist, never did and never will. Trees no more than humans relish the foul air and the harsh living conditions of cities and factory towns. I have mentioned the changed conditions of towns, its effect on the trees is apparent. The tree legacy we have inherited is mainly of magnificent American Elms and Sugar Maples, neither of which can adapt themselves to smoke and gas-laden atmosphere. Others of a tougher fibre will have to be found.

Now a word or two on the planting so rarely done properly. Too many people seem to think that having favored a tree by paying a dollar or so for it the same tree should be so overwhelmed with gratitude that it grow and flourish in any old soil or place. A puny hole in the ground is made, the roots thrust in, a few spadefuls of earth thrown over them and trodden down. What more can the thing need; man has honored it by purchase, now flourish tree and beam your thanks!

Let us consider the matter. Trees are living not

dead things like telegraph poles. They really should not be cemented in the ground nor just thrust in anyhow. The work should be done with thought and care and with due regard to the fact that being living things they need food and air—the roots as well as the leaves and branches. Proper pits should be made, pits eight feet wide and three feet deep, the sub-soil properly broken and the pit filled with good loam enriched with fertilizer. In building new highways these pits may be blasted by dynamite which is cheaper and better than digging. The dynamite method loosens the ground outward and downward and allows the roots to ramify easily. In this prepared pit and soil the tree should be planted and in this operation spreading out the roots is a most important thing. The ground should be firmed and the newly planted tree made fast to a stout stake for the first few years. In towns and cities it should be encased in a circular cage of iron, eighteen inches at base tapering to about a foot at the top as protection from hoodlums of all kinds. In the country the pits need no covering but, for the first few years, they should be forked over occasionally. In towns the pits should be covered completely with an iron grating. This admits air and water, allows pedestrians free moving space and does not obstruct the side-

walk. From time to time this grating should be raised, the surface of the pit forked over to keep the earth sweet. From fifty to seventy-five feet apart in the line is the distance to plant street trees.

Such is the correct method to plant. Too expensive you say? Paris and many other European cities practise this method, surely the richest country in all the world cannot seriously advance such a puerile excuse. And, remember, so planted and cared for these trees will pay dividends in the form of shade, beauty and air purification for one, two or three centuries.

Another item in the care of street trees remains to be discussed, namely pruning. As now generally practised in towns no subject gives rise to more acrimony or leads to more squabbling which not infrequently the law is invoked to settle. There is no necessity for anything of the sort and it is generally the outcome of a policy of neglect. To begin with, the trees planted should be nursery grown, each from eight to ten feet tall with a clean single stem and a straight leading shoot. Each year for the first twenty attention should be directed to keeping the leading shoot free of strong-growing side shoots; the lower branches should be removed one by one until the trunk is from twelve to twenty feet tall, all strong-

English Elm, Ulmus procera

growing lateral branches should be shortened and weak interior or cross branches removed entirely. Such amputations should be done cleanly with sharp tools close to the parent stem and the wound coated over with coal tar which acts as a styptic and antiseptic. In a few years the wound will be healed completely over with new tissues and quite invisible. On paper this may seem a formidable undertaking but it is not so really. If done every year the material removed will be little in quantity and small in size. If pruning be neglected, in the course of time the tree becomes roundheaded, unshapely or too broad necessitating a heavy expenditure of time and money in the removal of large branches and the tree is left unsightly often for years, sometimes ruined forever, and the ire of many a citizen is raised. It is when through neglect street trees have reached such conditions that trouble of all sorts breaks out. In every town or city there should be a competent man in charge and labor provided for the work of street tree management.

Trees need a protective league just as much as birds and children do. And such a league needs be lynx-eyed. The town and city beautiful with streets and highways lined with pleasant trees is a slogan worthy of the best citizens. The need is great, for the towns

and cities of this broad land are fast reproducing the worst features of those of the crowded parts of Europe and Asia.

It has been stated that the ideal street tree does not exist, also that the trees quite suitable when the towns were young are no longer so. What are the requirements necessary and desirable in trees for street planting? These depend considerably on the width of the streets but, above everything else, a type of tree that will grow freely and live long under city conditions is demanded. The highways are easily accommodated but streets are difficult and those of cities very much so. Books do not help much for the subject has received scant study. Neither can the experience of other lands solve our problem which is one that each country must solve for itself. Moreover, in a land so large as the United States, and with such extremes of climate, what is good for one region is worthless in another. Resort to our forests does not aid for, strange to say, the native trees resent most strongly city conditions. We have to look farther afield. Of a truth there is little enough to choose from yet there are trees suitable for nearly every city condition, but in no branch of gardening is more care necessary than in selecting trees for streets and highways.

Admitting that they will grow freely, the fitness of trees for street planting depends upon their possessing several other qualities. They must not have wide-spreading crowns, they must stand pruning well, they must not have objectionable fruits, they must hold their foliage late into the fall, they must not be prone to pests or disease. Rich in virtues, they must be veritable angels among trees. Now for New England cities and large towns, for those of adjacent Canada, those of New York and Pennsylvania, the street tree best approximating these qualifications is the common Hedge-row Elm of rural England commonly known here as *Ulmus campestris,* though experts say its correct name is *U. procera.* This is a vigorous, tall, long-lived tree with a massive trunk, erect and spreading branches, and it holds its leaves late into the fall seldom produces fertile seeds but increases readily by suckers. For nearly two centuries this tree is known to have been planted in this country, and, in the city of Boston, Massachusetts there are fine specimens of varying ages. The best, I think, are those near the reservoir at Chestnut Hill, Massachusetts. City conditions seem to the liking of this tree and, all in all, it is rich in virtues and the best we have. In its home land it has a sinister reputation for dropping its branches without warning and for

no known reason but I am unable to find an instance of it happening here. The Jersey and Cornish Elms, both European, have more narrow crowns and are probably equally amenable and should be given a trial.

A tree which seems to prefer bricks and mortar or ash-heaps to good soil is the so-called Tree of Heaven *(Ailanthus glandulosa)* which is quick-growing and with proper attention to pruning a good tree for city streets. It is a tall, good-natured tree with large pinnate leaves and unisexual flowers borne on different individuals. This is fortunate since the male flowers have an objectionable odor and for street work the female tree only should be planted. It is easily propagated by root-cuttings and this method should be employed.

In narrow streets, recourse must be made to trees with upright branches such as the Lombardy and Bolle's Poplars. Given good soil both grow well under city conditions but they are not long-lived.

The most famous and most widely planted street-tree in the world is, of course, the so-called London Plane *(Platanus acerifolia)*. This pre-eminence is due to its indifference to city conditions and ability to withstand severe pruning. For the central aisle of broad thoroughfares and for the embankments of

river fronts it is splendid and its rapid growth is a fine asset, but, it has a wide-spreading crown which demands continual pruning to keep in bounds and the tree is really unsuited for the streets of ordinary cities. For town squares and small parks it is ideal.

Good-natured and in consequence much planted are the European Lindens *(Tilia vulgaris* and *T. tomentosa)*, but these are really about the worst possible trees for street planting. They are very partial to aphis whose sticky exudations, added to the honey which falls from the flowers, cause dust and soot to adhere to the leaves choking the pores and the foliage turns yellow and brown before August is here. In Europe there is another Linden, known as *T. euchlora,* which is said to be immune from these disabilities and this should be given a trial as a street tree in this country.

The Horse-chestnut has been much planted but this again is a bad street tree. Under town and city conditions the leaves lose their freshness and become spotted with yellow and brown soon after midsummer, and, later, the falling fruits are too attractive to boys, and their husks are a nuisance on the side-walks. The Ash-tree is no good in the city and neither is any one of the Maples. And not one of the

Pine and Fir tribe can for one moment be considered as street trees for town or country villages.

For boulevards and main thoroughfares on the outskirts of towns and cities a greater variety of trees are available. Among the best trees for the colder parts of eastern North America must be placed the Red Oak *(Quercus borealis)*. There is a mistaken notion current that Oak trees grow slowly. Actually they grow as rapidly as other trees and more so than many. The rows of Red Oaks which line the Parkway through Jamaica Plain, Boston, Massachusetts, bear witness of the tree's quick growth and are one of the most pleasing and impressive tree avenues in this country. The Scarlet Oak *(Q. coccinea)* is another magnificent Oak for road-planting, though difficult to obtain. For moist situations the Pin Oak *(Q. palustris)* is to be commended though it does not grow old gracefully.

The Norway Maple *(Acer platanoides)* is a first-rate tree for town approaches growing freely with a fine bell-shaped crown. The gray-barked Sycamore *(A. pseudoplatanus)* is also good. The Sargent and Avium Cherries with narrow pyramidal crowns should be used for their wealth of flowers would add a cheerfulness in the spring. Many other trees could and should be so used, the Cucumber-tree *(Mag-*

American Elm, Ulmus americana

nolia acuminata), Keaki *(Zelkova serrata)*, Asiatic Cork-tree *(Phellodendron Lavallei)* and the Sen-tree *(Acanthopanax ricinifolius)* are examples.

For the country highways there are no better trees than the common White Elm *(Ulmus americana)* and Sugar Maple *(Acer saccharum)* of eastern North America. As an avenue tree there is no more beautiful tree in all the world than the American Elm with its wide-spreading, feathery umbrageous crown. Less graceful, but very attractive, is the Sugar Maple with its more or less ascending or spreading branches and multicolored autumn-tinted foliage. These two trees are an impressive feature of New England roadways and lesser towns but, unfortunately, they cannot withstand modern city conditions. But for its highways at large, the colder parts of eastern North America need not look beyond these two splendid native trees.

Poplars in general should not be used in eastern North America but in the middle west they are of great value and it will be a long time before they can be dispensed with. Some of the European sorts such as Norway, Volga and Berlin Poplars are very hardy. The handsome oriental *P. Maximowiczii* is worthy of more attention. For the same regions the east Asiatic *Ulmus pumila* is showing great promise.

This is a tall and shapely tree with small foliage, remarkably hardy and fast-growing. Like enough it will withstand city conditions.

In California Eucalyptus trees, chiefly *E. globulus*, have been much planted along highways. This is by no means a good tree for the purpose since it grows too rapidly and sheds its bark too freely. The wondrous red-flowered *E. ficifolia* would be much more serviceable and infinitely more beautiful. Another excellent species is *E. sideroxylon* with smaller, pink to crimson flowers and tenacious dark bark.

In southern California and in Florida the curious *Casuarina equisetifolia* is much planted but the west Australian *C. glauca* and *C. Fraseri* would be found better subjects than the Malayan species. And better still I think would some of the Australian Cypress Pines like *Callitris robusta, C. rhomboidea* and *C. arenosa*. These are medium-sized, round-topped trees that grow well in warm, sandy soils.

The practical among us will say that it is all very well to talk about trees for streets and highways, but where are they to be obtained? We used to draw them ready grown for Europe but where are they now? The problem of supplies is up to the nurserymen. The wise among that class would find a good investment in raising in quantity a selection of the

best and most desirable kinds. Here in New England for street purposes in quantity almost unlimited should be raised that peer among trees for our cities the English Elm—the *Ulmus campestris* of our elders, nowadays styled *Ulmus procera.*

HEDGES AND HEDGE PLANTS

HOW TO MAKE AND MAINTAIN A PROPER HEDGE

S LOVE of home and home life increases there is quickening of desire for quietude and seclusion, a yearning for freedom from intrusive eyes. With no desire to rob neighbors or deny to passers-by sight of the beauties of the garden sooner or later the impulse is to screen it in part or wholly from the common gaze. This is one reason for planting hedges, another is to secure protection from the wind, another to keep out cattle. Some rail against hedges as indicative of a selfish, churlish spirit but sooner or later are themselves guilty of planting one. In Europe the garden hedge ranks next to the lawn in importance and in attention bestowed upon it.

If hedges are to give protection, afford seclusion and at the same time be objects of beauty they must be properly planted and properly trimmed. Also they must be of the right sort of material. Many times in spring have we all seen on the sidewalk edge fronting newly built houses and apartments men at work with pick and spade fashioning a narrow trench. The debris spilled from the construc-

tion greatly increases the labor and usually the sides and bottom of the narrow trough resemble in solidity the concrete of the sidewalk or the cement of the house. Into this channel are thrust thickly small plants of California Privet or Thunberg's Barberry which have been wintered in pits, cold greenhouses or cellars. The earth is thrown back and trampled down, the tops of the plants trimmed to an even height, occasionally the hose is brought into use and rarely, very rarely, a mulch of some sort is spread over the disturbed surface. The hedge is thus planted as cheaply as possible with the cheapest of material and the owners of the property or occupants are left to grumble as it dies, which in part or wholly it most frequently does. The cynic may smile at such wasted effort but the lover of plants is saddened to see the abortion of good intentions. Ignorance is the real trouble but dealers who dispose of inferior material and the jobbing gardener who plants in such fashion are much to blame. The suburbanite pays. Proper hedges can only be had by planting proper material in a proper manner. The material must be perfectly hardy, nursery grown and properly wintered, preferably in the open ground. It is most necessary that the plants used be in vigorous health when set out since they have from the outset to with-

stand harsh conditions. Radiation from the sidewalk, winds, dust, the hot sun overhead are all inimical. A moment's reflection proves this and should move those interested to efforts best calculated to promote the welfare of their intended hedge.

A hedge should be densely clad with branches from the ground up and be impenetrable. To secure this careful clipping from the earliest stages must be maintained. With few exceptions, such as Privet, van Houtte's Spiraea and Box Honeysuckle, plants for hedge-making should be raised from seed, not from cuttings, grown in nursery rows and rogued for their special purpose in order that uniformity of habit may be attained.

First a word or two on preparing the trench, the soil and manner of planting. The width and depth of the trench depends upon the size of the plants to be placed therein and should be regulated accordingly. The bottom of the trench and the sides should be loosened and care exercised not to cramp the roots. Good loam, and if turfy so much the better, is the requisite. If the soil is poor fertilizer should be added liberally. There is nothing so good as farmyard manure but bone-meal is a fair substitute. The distance apart in the line depends upon the size of the plants used. If quite small a foot is plenty and

a double line, the plants alternating, is a good practice. If larger, place them so that their branches almost or quite touch each other for the object is to form a dense screen as quickly as possible. Firm the soil well over the roots and apply the hose to settle it evenly. Finally, add a mulch of straw manure, salt hay or granulated peat to conserve moisture and keep the roots cool. Trim the plants evenly and encourage growth by watering freely when drought threatens. If such methods be followed good growth will be apparent the first year. The second year shaping and trimming will be necessary and in succeeding seasons this work must be regularly carried out for on this depends not only the appearance of the hedge but its very permanence. The task is simple although one rarely sees it done perfectly. A hedge should always be broadest at the base, tapering slightly upward. Never the reverse. The shape in section should be that of the capital letter A. This shape allows uniform access of air and light and permits the drip after rain to fall through the branches. Thus shaped the hedge does not get bare at the bottom from suffocation of its leaves but remains permanently dense from base to summit. With plants of tree form never clip the leading shoot until the desired height of the hedge is attained. From time to

time fresh food will be necessary which can be applied as a mulch or forked into the soil carefully. Where hedges are intended as boundaries to resist stock it is well to plant them on a bank, digging a ditch in front and protecting them by a fence placed about four feet in front until they are sufficiently tall to ward off animals.

Now as to material. Almost any kind of woody plant can be fashioned into hedges but those of twiggy habit of growth are most serviceable. As a rule one sort of plant only should be used but mixtures such as Hawthorn, Beech and Hornbeam can be advantageously employed. The first essential is complete hardiness so the plants usable vary in kind according to climate, the warmer the region the greater the variety available. The desired height of the hedge is also a very important factor in determining material.

The two most popular hedge plants in northeastern North America are Privet and Thunberg's Barberry, their popularity being largely due to the cheapness and readiness with which material can be secured. For making low broad hedges, Thunberg's Barberry is rich in good qualities. It is very hardy, withstands considerable abuse and is good to look upon at all seasons of the year, not least in winter

HEDGES OF EVONYMUS RADICANS CARRIERI ON RIGHT AND TSUGA CANADENSIS ON LEFT

when strung with its scarlet fruit. The Privets have been favorites for years past and are likely to remain so. Where they are fully hardy they have much to recommend them for this purpose. For instance at Newport, Rhode Island, they thrive and Privet hedges are a feature on very many estates. But in New England generally and regions with a similar climate the so-called California Privet *(Ligustrum ovalifolium)* is not hardy and therefore should not be planted. This Privet is native of the seacoast of Japan and cannot withstand zero temperatures with impunity. Over a wide area in America this plant is perfectly happy and of great usefulness but for the colder parts the Amur Privet *(L. amurense)*, Ibota Privet *(L. obtusifolium)*, and the European Privet *(L. vulgare)* should be substituted. The Privets are greedy feeders unmerciful to flower-border and lawn. They grow freely and quickly and need clipping three or four times a year to keep within proper shape and bounds.

Evergreen hedges are best since in winter they are restful and cheering. For those who garden in cold temperate regions such evergreens must be sought among narrow-leafed plants and are few in number. Fortunately, however, the Yews, best of all hedge plants, are available. For New England and regions

of similar climate the Japanese Yew *(Taxus cuspidata);* for much of the Pacific coast, for gardens south of the Delaware River and even further north on the coast where the Gulf stream exercises its genial influence, the European Yew *(T. baccata).* Where these two plants can be grown there is nothing better for hedges. They are partial to good food but are not particular as to character of soil and live to a ripe old age. In England, for example, there are Yew hedges a century and more old. Yews will thrive in damp and heavy soils which are unsuited for many plants. It is wisest to use seedlings and in the long run it will be found best to plant them when about a foot tall. Set them out as early after mid-August as rain permits. Where space and labor are limited make the original planting of these seedlings a foot apart and later remove every alternate plant just before they touch one another. The surplus can be used elsewhere and opportunity to work in some manure in the places vacated is afforded. This suggestion can be profitably adopted with other plants and in many circumstances.

Although the Japanese Yew has been with us for more than sixty years our nurserymen are only beginning to appreciate its great value. It is now being widely propagated in feverish haste, chiefly from cut-

tings, but the demand exceeds the supply. Fortunately it has long been established in a few important gardens and stocks raised from seeds. Even more fortunate, it has hybridized with the European Yew and given rise to a race *(T. media)* exhibiting wide variation in habit of growth and of great hardiness. What is needed, for hedges especially, is large stocks raised from seeds and selection of uniform types of growth.

If properly trimmed, the common Arborvitae *(Thuja occidentalis)* especially the form *robusta,* makes a good hedge if kept to moderate height, say from six to eight feet. In California and other genial climates the Monterey and Lawson Cypress are also valuable but none of these plants suffer neglect with impunity. Unless constantly cared for they soon become unshapely, top-heavy, the branches dying at the base and not infrequently the whole plant. Better than any of the above is the Giant Thuja *(T. plicata)* but this is expensive and very difficult to procure in quantity.

For tall hedges, and windbreaks especially, the White Pine *(P. strobus)* and various Spruces may be used to advantage though they are apt to form much dead wood within the hedge. Best of Conifers for making a tall hedge is the common Hemlock *(Tsuga*

canadensis) which with its graceful frond-like branches clothed with dark green leaves is beautiful at all seasons of the year. It stands clipping as cheerfully as does the Yew but imperatively demands that it be kept broadest at the base. Here and there in New England are many fine Hemlock hedges, but the best I know of is on the Bayard Thayer estate at South Lancaster, Massachusetts. This splendid living screen of lustrous green is fifteen feet high and fifteen feet through the base and in perfect health.

Of broad-leafed evergreens well suited for hedges few or none flourish in climates so cold as that of New England. The Inkberry *(Ilex glabra)* might be used, the Andromeda *(Pieris floribunda)* and Mountain Laurel *(Kalmia latifolia)* certainly, but great skill would be needed to maintain them properly in shape. On Long Island and southward a Japanese Holly *(Ilex crenata)* and the American *(I. opaca)* offer possibilities. In parts of California and in the warm southwestern states the European Holly *(I. Aquifolium)* thrives and of broad-leafed evergreens there is no finer hedge-plant. Its lustrous leaves and scarlet berries, its dense and shapely habit are virtues of unsurpassed value. It does not flourish on heavy clay soils, requires good food and should be clipped around midsummer. This Holly withstands

the smoky conditions of towns in a remarkable manner.

The common Box *(Buxus sempervirens)* is an old-time favorite in gardens and much used for hedges. It has many fine qualities and does well in chalky soil but if injured or once out of health it is slow to recover. Like the Holly and Yew there are wonderful old hedges of Box across the Atlantic and many readers there be with memories of such in English gardens and castle grounds. As a low edging in formal gardens there is no greater favorite than the variety *suffruticosa.* Many will recall this pleasing shrub so happy in Washington's garden at Mt. Vernon and in other gardens further south. This useful plant is hardier than the type though the common Box in none of its forms is properly hardy in New England generally. A worthy substitute, however, is afforded in *B. japonica,* which grows quite tall, and *B. koreana* which does not exceed two feet. Both are very hardy but they are yellowish brown during the winter and lack the pleasant fragrance characteristic of the common Box.

A first-class plant for low edgings is *Evonymus radicans* var. *Carrieri.* This is quite hardy as far north as Boston, Massachusetts, but requires careful clipping and training. Another excellent ever-

green Evonymus for making hedges is *E. patens*, which is hardy so far north as Providence, Rhode Island. This has broad ovate leaves, each rather more than one and one-half inches long, dark, slightly shining, green and leathery of texture. It is sold by some nurserymen under the erroneous name of *E. Sieboldii* and is fast gaining in deserved popularity. For shore gardens in mild climates *E. japonica* is a long standing favorite. Salt spray does it no harm and properly cared for it makes a dense and excellent hedge. There are yellow and white variegated forms of this lustrous-leafed evergreen. Like other Evonymus it is prone to scale insects and to maintain in perfect health requires spraying from time to time.

Were Californian gardens bereft of *Berberis Darwinii* they would lose one of their chief ornaments. This lovely shrub hails from South America and worthily commemorates the great naturalist who discovered it in 1835. Of compact habit it grows fully twelve feet tall, bears rich orange-colored blossoms in racemes and is densely clothed with dark shining green, spiny, sessile leaves. It makes a splendid hedge and bears abundantly plum-colored, oval, pea-like fruits, the seeds of which insure the ready increase of the plant. A hybrid of Darwin's Bar-

berry and another South American species *(B. empetrifolia)* is *B. stenophylla,* the loveliest of all the evergreen Barberries. This has arching, whip-like branches, narrow black-green leaves and golden yellow blossoms. Planted on top of a bank or at the foot of a low wall it can easily be trained into a beautiful hedge requiring only to be trimmed immediately after flowering. So trained it is mound-like in appearance with gracefully arching and hanging branchlets. California and the south should treasure this plant.

Much used in California is the comparatively new Box Honeysuckle *(Lonicera nitida)* which I discovered and introduced from the Chino-Thibetan borderland in 1908. It is a twiggy bush of very rapid growth and easy propagation which bears clipping remarkably well. The leaves are small, lustrous dark green and Box-like, and the whole plant singularly neat and pleasing. The Escallonias with the white, red and pink blossoms and small shining leaves are excellent as hedge plants for California and the warm south. And in the same regions for high hedges the Olive and various Live Oaks can be used. The Oleasters (Elaeagnus spp.) are hardier and well adapted for screening shore gardens.

On Cape Cod and various parts of New England

the so-called Japanese Quince *(Chaenomeles lagenaria)* is a favorite old hedge plant and when rightly trimmed is quite a success. Its thorns make it formidable and its brightly colored flowers starring the branchlets add to its beauty. Like all the great Rose family the Quince is partial to scale insects and spraying is frequently necessary for its health and development.

Van Houtte's Spiraea is much planted in the northern parts of this country and when young and wreathed in blossoms is pleasing enough, but it does not grow old gracefully and requires continual attention. I do not think that this or any other Spiraea make good hedge plants. Around Philadelphia and elsewhere I have seen hedges of the interesting spiny Hardy Orange *(Citrus trifoliata)*. This is really a good subject for the purpose and deserves to be more widely used in temperate parts of this country.

If the object of a hedge be to form an unclimbable rampart of defense against stock or vandals plants armed with formidable thorns are best. For such purpose nothing is better than the Hawthorns; almost any of which will serve. The marvellous network of hedges that give so much character to cultivated England is composed almost entirely of Hawthorn or Quick *(Crataegus monogyna)*. This plant

HEDGES OF EUROPEAN BEECH, FAGUS SYLVATICA

is cheaply and easily produced, is formidably armed, is amenable to persistent clipping and is very hardy. It is much used in the northern parts of New York state and abundantly so in New Zealand. Some of our native Hawthorns if started right and kept trained are equally good and none more so than the Cockspur Thorn *(C. crus-galli)* with its lustrous foliage. A plant formerly much used for hedges in New England is the Buckthorn *(Rhamnus cathartica)* but this is coarse in character and prone to get bare and leggy at the base.

For a high hedge and windbreak on clay soil the European Hornbeam *(Carpinus Betulus)* is to be recommended. The best way to plant Hornbeam is to incline every two plants toward each other so that they intersect in the form of St. Andrew's cross. At the point where the main stems cross each other scrape off the bark and bind them together, a natural union by grafting will then take place and the horizontal slanting shoots form a living palisade with yellow-brown autumn foliage retained throughout the winter.

On warm dry soils there is nothing so good among deciduous plants for tall hedges as the European Beech *(Fagus sylvatica)*. Planted closely together hedges fifty feet high can be had of this, and as a high

windbreak and defense against cattle there is nothing better. Owing to its dense branching habit it is easily fashioned into a narrow hedge impenetrable to man and beast. It retains its russet-brown autumn foliage until spring giving a sense of warmth throughout the winter, and if properly clipped lasts for centuries. In Europe, especially in Belgium and Great Britain, such hedges are common. The most famous Beech hedge, probably is that of Meikleour in Scotland. It is claimed that this hedge was set out in 1745 and that the men who were planting it left their work to fight at the battle of Culloden, hiding their tools under the hedge and never returned to claim them. This wonderful hedge is 580 yards long, ninety-five feet tall and is dense from the ground up. There is also a Beech hedge on the estate of Cameron of Lochiel, the history of which is even more remarkable. In 1715 the trees were laid in the soil slantingly ready to plant permanently when the men were called away to take part in the rebellion of that year. The men never returned to the task and the trees have grown up in a slanting position close together just as they were left.

CLEMATIS

BLOSSOMS OF EVERY HUE

CLEMATIS are cosmopolitan plants rich in virtues of surpassing merit. A few of the members are little more than herbaceous perennials but the vast majority are plants which, climbing by means of twining leaf-stalks, grow from six to sixty feet tall. In general they are free-flowering, many sorts extraordinarily so. Some blossom in the spring, quite a number in the autumn but by far the greatest number bloom continuously throughout the summer to early fall. No other group of climbing plants produces so large blossoms and none boasts such a wide range of color. The flowers vary in size from about one inch *(Clematis paniculata)* to eight inches *(C. Henryi)*; in form they may be tubular *(C. Davidiana)*, star-like *(C. apiifolia)*, platter-like *(C. Jackmanii)* or urn-shape *(C. Viorna)*. The colors range from bright red *(C. texensis)*, clear yellow *(C. tangutica)* and pure blue *(C. patens)*, through varying shades of red and magenta to rich purple tones *(C. viticella)*. In a great number the flowers are white, in some they are pure pink *(C. montana* var. *rubens)*, and in others

lilac to lavender *(C. lanuginosa)*. What many species lack in size of blossom they make up for in quantity, whilst a pleasant fragrance is an attribute of the rank and file. Some are evergreen *(C. Armandi* and *C. indivisa)* but the greatest number lose their leaves in the autumn. Certain species are handsome when past flowering on account of the large fluffy heads of silken fruit. The common name Virgin's Bower portrays their graceful habit of growth and wealth of wreathing blossoms. That of Old Man's Beard denotes the characteristic appearance when in fruit, but that of Traveller's Joy symbolizes them best since it conjures up the pleasure they give in decking wayside bushes, tree-trunks, boulders and stone walls with a multitude of pretty flowers and fruits.

They are indeed joyous plants and as befitting such demand that their upper parts at least bask in the sun's full presence. In planting it is best to place them on the west or southwest side of wall or tree-stump so that they may enjoy some protection in early spring, but, as they burst into growth they should not lack free air and sunlight. One other, and a very important point indeed, Clematis are lime-loving plants. When this mineral is not naturally present in the soil it should be added. Some of the

sorts grow well in ordinary garden soils but all are benefitted by a dressing of lime.

Nurserymen should grow for sale Clematis plants in pots since they are more easily and successfully transplanted this way. When once established leave Clematis severely alone for they resent root interference. When pruning is done it should have relation to controlling the plants within the space available. In the spring-flowering sorts the necessary trimming should be done immediately after they have blossomed. The large-flowered kinds should wait until the plants commence to sprout into growth in the spring when all dead wood can be removed and straggling shoots shortened to a healthy vigorous bud. The rampant growing autumn-flowering species can be more severely dealt with in the spring as growth shows signs of commencing.

Clematis, like human beings, object to draughts about their feet and ankles. They are best accommodated against walls, tree-trunks, or trellises attached to buildings, also they make a glorious tangle over rocks or old tree-stumps and, aided by twiggy branches, form hummock-like masses in borders. In nature Clematis are mostly denizens of thickets and margins of woods; some court the shelter of boulders and cliffs, whilst a few luxuriate midst screes in high

alpine meadows. They are gross feeders delighting in rich, well-drained loam and abundance of leaf-mould. To this farm-yard manure should be added as a mulch against summer's drought and winter's cold. Bone-meal is an excellent food for Clematis since to them lime is so essential. They are propagated readily and simply from seeds; also by cuttings and by grafting on pieces of root but these methods to be successful demand professional knowledge, skill and equipment.

Apart from the ubiquitous *C. paniculata,* whose ubiquity is warranted by its floriferous qualities, its fragrance and graceful beauty, very few Clematis are really grown in American gardens. The large flowered hybrids have many admirers but seemingly they are not very successful with these gaudy blossomed aristocrats. In and around Montreal I have seen in greater quantity and perfection the glorious Jackmani types than elsewhere in North America. Does the natural limestone soil of Montreal give the clue? Only in part, I think, since if it did these plants ought to be in equal evidence throughout western New York.

The large-flowered Clematis are of mixed parentage and obscure origin. It is doubtful if some of the printed stories concerning them have foundation in

PURPLE-FLOWERED CLEMATIS JACKMANII

fact. The original Clematis of this class is supposed to be *C. Hendersonii,* which is said to have been obtained about 1830 by crossing *C. viticella* and *C. integrifolia.* It is still a popular plant which grows from six to eight feet tall and produces from July to September bluish purple flowers, each from two to three inches across and borne singly on four-inch-long stalks. A slender not very woody plant, it dies almost to the ground-level each year. In truth *C. Hendersonii* is not far removed and is probably a form of *C. viticella* which is native of southern Europe and grown in gardens since the Sixteenth Century. This has bluish to rosy purple flowers solitary on long stalks and each about one and one-half inches in diameter. There is a nearly white flowered form *(alba)* and an ugly double-flowered one also. But *C. viticella* and *C. Hendersonii* best claims to fame are as part parents of *C. Jackmanii.* The other parent is said to be the oriental *C. lanuginosa.* The Jackmani race of Clematis, with flowers of varying shades of purple and each from four to five inches across, has been a prime favorite for more than half a century. Where happy they are vigorous growers delighting in sunshine and blossoming freely from July to October on the current season's shoots. The part-parent *C. lanuginosa* is native of

China and from that land and also Japan we owe *C. patens* and *C. florida,* both with large flowers. Hybrids and seminal forms of these three species with flowers white, pale lilac, blue to deep violet-purple in color, and each from four to eight inches in diameter have been raised in gardens. Taken collectively the large-flowered Clematis form a most gorgeous group with platter-like blossoms produced in rich abundance from midsummer to late September. Among the named sorts listed by our nurserymen are Henryi with white, eight-inch broad flowers, Duchess of Edinburgh with large double-white blossoms, Ramona with light blue and Mme. Edouard Andre with dark crimson flowers. Altogether there are a score or more of these named varieties but many are difficult to obtain in this country.

A vigorous climber producing luxuriant fascicles of white flowers in spring is *C. montana,* wide-spread in China and on the Himalayas. It is scarcely hardy north of Rhode Island but south to Washington it ought to be widely grown. There is a summer-blooming sort (var. *Wilsonii*) and another (var. *rubens*) with dark foliage. These two varieties I discovered and introduced from China some twenty-five years ago and experts acclaim them to be among the most notable additions to gardens in recent times.

The type and its varieties are sturdy growing vines with three-foliolate leaves and blossoms in great plenty. The variety *rubens* is hardier than the typical *C. montana,* flowers regularly every season and is readily increased by cuttings. Two closely related species are *C. chrysocoma* with white flushed with pink and *C. Spooneri* with white blossoms. Both have soft silky leaves and are free-flowering. Already the French hybridists have been busy with these Clematis and the future will see a fine race of spring and early summer blossoming vines evolved from these orientals. Somewhat resembling these is *C. Fargesii,* a hardy species with many foliolate leaves and ternate, clustered masses of two-inch broad flowers produced freely about midsummer.

There is a prominent group of Clematis represented by species in many parts of the northern Hemisphere, which flowers in August and September. In this part of the world it is featured by *C. virginiana* and in western North America by *C. ligusticifolia;* in Europe *C. flammula* and *C. vitalba* represent this group whilst in the Orient there are *C. apiifolia, C. grata, C. Gouriana* and several others. In general appearance all are much alike with white or cream-colored, fragrant flowers and variously incised leaflets. The individual flowers are small but the wealth

of blossom completely hides the foliage. Allowed to ramble freely, these vines drape and garland bush, tree and trellis in billows of white and are conspicuous from afar. After the flowers are over the feathery heads of fruit are singularly pleasing. The most hardy and satisfactory of these is *C. apiifolia* and in the Arnold Arboretum, where on walls and gate pillars it is freely used, it never fails to excite the admiration of September visitors. More beautiful than any of this particular group, however, is the favorite *C. paniculata* with pure white fragrant blossoms and dark green almost lustrous foliage. So well known is this charming vine that description is superfluous but of the thousands who love this plant few know that, like Thunberg's Barberry, it is a gift of the Arnold Arboretum to American gardens. In 1877 seeds of this Clematis were received from Russia by the Arnold Arboretum. They germinated freely and later plants were distributed. Nurserymen soon realized the value of this useful garden plant and it has been propagated and distributed by the million.

A closely related but not woody species of Clematis is the European *C. recta* of which a superior form *(mandshurica)* is wide-spread in eastern Asia. Both may be regarded as herbaceous plants which, dying down each autumn, give rise in the spring to vigor-

ous shoots that grow four to five feet tall, and form tangled, balloon-like masses of white blossoms in July and August. They are easily accommodated in the flower border and are very hardy.

There are half a dozen different species of Clematis that have yellow flowers, all of them native of different parts of temperate Asia. In these the flowers are nodding, more or less urn-like and slightly spreading at the apex. The oldest known is *C. orientalis* which is found from the Caucasus to central Asia and has been known in gardens since 1731. Much more beautiful, however, is *C. tangutica,* native of northwestern China and adjacent Turkestan and introduced into gardens as recently as 1898. This is a very hardy plant, quite happy around Montreal, growing some ten to twelve feet tall with grayish green foliage, raggedly cut and lobed, and rich yellow, top-shaped, long pointed flowers borne singly on six-inch long stalks. The flowers arise from the leaf axils of the current season's shoots in June and July and are followed by large feathery heads of fruit of singular beauty. Topping a wall, clothing a trellis or sprawling over boulders, this plant is exquisite. An equally good plant is the variety *obtusiuscula,* distinguished by having short pointed flowers, which came to our gardens from western

China in 1910. A related species with smaller flowers freely produced in August and September is *C. serratifolia,* a native of Korea.

Common in bleak arid parts of Siberia and northern China is *C. glauca* with glaucous green leaves and yellow or bronzy yellow flowers produced in axillary clusters. This is a variable plant of which several forms have received names. The best of all is var. *akebioides,* plentiful on the margins of sub-alpine thickets and on rocks and screes in western China. It produces in August bronzy yellow urn-shaped flowers in quantity and is a very worthy plant which I am pleased to have discovered and introduced to gardens in 1904. If planted at the base of boulders or low walls and allowed to ramble it will form a fine drapery crowded with attractive blossoms at the off season. All these yellow-flowered Clematis grow where snow abounds in winter and relish its protection.

Native of Texas is the lovely *C. texensis,* a slender vine with urn-shaped, almost closed, thick, fleshy flowers, carmine to scarlet in color. It is better known in gardens as *C. coccinea,* and there is no more brilliant bit of color among the entire Clematis tribe than the bright scarlet flowers of the form *major* of this Texan species. This plant rarely exceeds six feet in height

and produces its blossoms singly from the leaf axils. It has been crossed with *C. Jackmanii* and the hybrid named *C. pseudococcinea.* Here belong the new creations, Countess of York, Countess of Onslow and Countess of Albany, much in vogue across the Atlantic. Similar in form of flower is *C. Viorna* (Leather Flower) and *C. Simsii* both natives of eastern North America. These have purple flowers and have been known to gardens for more than a century. The last-named lacks the feathery fruits so characteristic a feature of most Clematis.

Another very distinct set of Clematis is represented by *C. alpina* and a few cognate species, which are characterized by more or less bell-shaped flowers, usually violet-blue to rich violet-purple in color. The typical *C. alpina* is native of Europe and northern Asia; a variety *(sibirica)* has cream-colored flowers. In north China and Siberia grows *C. macropetala,* remarkable for the large size of its rich violet-colored flowers. In Colorado, Utah and New Mexico *C. pseudoalpina* represents the group. All are slender vines, rarely six feet tall, which ought to be more extensively grown in gardens. The structure of the flower is rather different to that of Clematis proper and for this reason some would place them in another genus under the name of Atragene.

All are happiest among rocks in associationship with low shrubs over which they delight to ramble displaying their blossoms in late spring.

A partly shrubby non-climbing plant is *C. heracleifolia* with blue tubular flowers. This grows about a yard tall and has broad rather coarse leaves. A much better garden plant is *C. Davidiana* with large indigo-blue fragrant flowers, tubular in form with the upper half spreading. Another but less woody species is the Japanese *C. stans* with lavender-colored, smaller flowers. Bearing axillary and terminal flower clusters, these form an interesting and very hardy little group which can be accommodated in the flower border but are most effective under a wall or among rocks.

Since more than 230 different species of Clematis are known it is obvious that only a cursory survey of the genus is possible here. So far attention has been directed to the sorts which lose their leaves at the approach of winter. In conclusion a few words may be devoted to a couple of species, representative of a considerable group that retains its leaves through the winter. In central China as spring bursts the first vine with conspicuous blossoms to enliven thickets and margins of woods is *C. Armandi*. This is a strong grower with stems often thirty feet long,

SUMMER-BLOOMING CLEMATIS MONTANA WILSONII

clad with dark green, glossy, leathery, three-foliolate leaves from the axils of which arise clusters of white, pink, or white changing to pink, slightly fragrant blossoms, each from two to two and one-half inches across. The individual clusters are three-flowered but many arise from the same leaf-axil and often a score or more blossoms are bunched together. I have seen ropes of stems bearing hundreds of axillary clusters numbering in all thousands of flowers and have marvelled at the beauty presented. It was my good fortune to introduce this plant into gardens in 1900. Unfortunately it is not hardy in Massachusetts but from Philadelphia south it ought to succeed and around San Francisco it should luxuriate. This and *C. montana* var. *rubens* I count among the finest climbing plants it has been my privilege to add to gardens.

The most beautiful vine that New Zealand has contributed to gardens is the evergreen *C. indivisa* which has shining, leathery, dark green, three-foliolate leaves and axillary panicled masses of milk-white fragrant flowers. A strong grower its stems will attain a length of forty to fifty feet and in season produce myriad blossoms. It is a greenhouse plant for all but California and other warm parts of this country.

WILD ROSES

FLOWERS OF THE WAYSIDE WORTHY OF ANY GARDEN

VERYBODY knows and everybody loves the Rose. Usually when one speaks of Roses the thoughts are of the Modern Rose—Hybrid Tea or Hybrid Perpetual, Tea or Pernetiana, Rambler or Rugosa-Hybrid, —products of the untiring skill of enthusiasts in many lands. Some, indeed, the culminating effort of decades, others the fruit of yesterday. Beautiful in form and color, often rich in delightful fragrance they rank as Queens and Kings in gardens. To bring them to perfection nothing is spared. Special soil, special care and often special gardens are the portion of these favored flowers. Wonderful is the Modern Rose yet its origin was humble and the position it has reached may be surpassed by others of which we know not. But my theme is not of the Modern Rose. Other scribes may sing its praises, I tell of the wayside Roses of this and other lands.

Of Wild Roses there are a great many species and these vary so much that no two authorities are agreed as to the number. They are found throughout the length and breadth of the northern Hemisphere from

near the Arctic Circle to the Tropic of Cancer. Some are diminutive shrubs, others vigorous rambling plants which climb to the tops of trees. Nearly all have the familiar leaf, prickle, five-petalled flower, usually clustered, rarely solitary, and the characteristic hip or fruit. Their garden value depends largely upon their hardiness. Very few of the climbing sorts can withstand the rigors of New England climate but of the bush forms a great number are perfectly at home with us. Indeed, some think that the garden Rose of the future so far as the colder parts of the world are concerned will be evolved by blending these perfectly hardy wildings with the toughest sorts of the Modern Rose. But apart from interesting possibilities many kinds of Wild Roses are well worth a place in our gardens. In point of fact their uses are much greater than is generally appreciated. All have beautiful flowers and many are extraordinarily floriferous. Some have fragrant blossoms and the color is usually pure and refined. They can be grown without any special effort though none object to good soil. Full exposure to sun and wind is essential. Pruning is not the elaborate business it is with the Hybrid Tea and others. All that is necessary is the cutting away of the old and worn out

canes and the shortening back of over-vigorous shoots so as to keep the plants within bounds.

Wild Roses may be used against pillars, fences, walls or on boulders to excellent effect. They should be given plenty of room and especially such sorts as the Prairie Rose *(R. setigera)* so well-suited for grouping, others like the Scotch Rose *(R. spinosissima)* may be used in beds. For seashore gardens *R. rugosa* is one of the best of all plants. In Japan it is known as the Sea-tomato—a very apt name, when its natural habitat and its fruit are remembered. In the Arnold Arboretum the common Seashore Rose of New England *(R. virginiana)* is much used for planting between the sidewalks and the carriage drives. Borders about five feet wide and a hundred yards long are a feature and no plant could be more serviceable or effective. In June these strips are lit with thousands of soft rose-pink blossoms; in the autumn they are jewelled in countless numbers of scarlet hips, and throughout the winter and early spring the ruddy erect stems are cheery to look upon. No protection of any sort is required and this most pleasing plant is attractive at all seasons of the year.

A Wild Rose of recent introduction that has captured the garden-lovers of America is *R. Hugonis* from the mountains of central and western China.

ALTAI ROSE, ROSA SPINOSISSIMA ALTAICA

At the moment it is easily the most popular species in this country. The habit leaves nothing to be desired. The stems are ascending with the outer ones arching gracefully to form a rounded bush from four to six feet tall. It is among the earliest of Roses to open its blossoms and so freely are these borne as to transform the branches into sprays of flowers hiding the leaves and the whole plant in a bouquet of soft yellow. The fruit is dark scarlet, ripens and, unfortunately, falls early. In China it flourishes on rocky semi-arid mountain-slopes and valleys revelling in good drainage, hot summers and cold winters. Its history is interesting. It was discovered by a Welsh priest named Hugh Scallan attached to an Italian Mission who sent a parcel of dried plants to the British Museum. When looking the material over the authorities noticed some Rose hips and sent them to Kew Gardens. In course of time these vegetated and later when the plants flowered the Rose was named *R. Hugonis* for its discoverer. In 1908 it was received at the Arnold Arboretum and soon afterward passed into American gardens. There is another yellow Chinese Rose in cultivation named *R. xanthina* with both single and double flowers but this does not appear to have taken so kindly to this

country. At least I have never seen it doing justice to itself here as I have in the gardens of Korea.

From the remote and arid regions of Afghanistan and the tableland of central Asia came the charming *R. Ecae,* a Rose of rare beauty and perfect hardiness with pale yellow flowers and leaves with the fragrance of Sweetbriar. This is a shrub from five to six feet tall with many erect reddish stems and neat shining foliage. As yet it is scarcely in the trade but when properly known all will want it.

A century ago scores of varieties of *R. spinosissima* were grown under the name of Scotch Roses. Like others they have largely disappeared from gardens in favor of the Modern Rose. This is a pity for they are pleasing plants of supreme hardiness preeminently suitable for the colder parts of this country and Canada. As a class they are low, twiggy bushes from two to five feet tall, suckering freely and form masses of permanent character. They have white, pink, rose-red and yellow flowers and there used to be sorts with double flowers of varied hues. All are of good habit with small pleasing foliage and black fruits and the fact that they are native of the coldest parts of boreal Europe and Asia attests their value to northern gardens. The aristocrat of the species is the variety *altaica* from the Altai Mountains of

Siberia. It is more vigorous and taller than its sisters, growing fully six feet tall with pure white flowers, each two inches across, abundantly produced. A well-known Rose enthusiast living near Chicago has aptly named it the Hardy Cherokee Rose. Of hardy white Roses it is my favorite and I know of none more worthy, either as a specimen bush, for massing or for using as a hedge. No northern garden should be without it.

Wild Roses are plentiful in northern lands but nowhere are they so abundant as in China, the land of flowers. Everywhere from sea-level to mountain top in that land Roses luxuriate and in season the air is redolent with the fragrance of their myriad flowers. As I write memory recalls delightful mornings and evenings in May and early June when I roamed through an Eden of Banksian, Musk and other Roses and drank my fill of fragrance from festooned bush and tree. And many a tear of cloth and flesh have I suffered from their prickles when gathering specimens to press or seeds to send home. 'Tis good to have lived such memories but better still to have been the fortunate means wherewith others can share the joys by growing in their garden in the Occident some of the gems of far off western China. Of Wild Roses it has been my privilege to add some twenty-five spe-

cies to our gardens. Across the water the one acclaimed above all others is *R. Moyesii* which I culled from the austere borderland of China and Thibet and named for a missionary who welcomed me with hospitality in 1903. The beauty of this Rose is in the rich lustrous red shade of its flowers and its brilliant scarlet hips. I prefer to be ambiguous in reference to the color since enthusiasts have quarrelled vigorously over it and are still far from agreement. I am fully content that its worth and beauty have won their hearts. Vigorous, hardy, beautiful in foliage, flower and fruit, this wilding has in critical field won the first-class certificate of the Royal Horticultural Society of London, than which there is no higher award. In the Arnold Arboretum this Rose grows well, is perfectly hardy and fruits in perfection, but the dry hot air of early summer dims the rich lustre of its flowers.

In the garden of my friend Horace McFarland at Harrisburg, Pennsylvania, flourishes a particularly good form of *R. setipoda,* another of my finds in China and I do not envy any critic who speaks disparagingly of this Rose when McFarland is within earshot. It is a strong grower with stems arching over and in season a cascade of rosy red flowers followed by brilliant scarlet fruit. A related species

with rich red flowers is *R. bella,* a dense compact shrub about five feet tall and as much in diameter and well worthy of its name.

Two pleasing species with gray-green foliage, pure pink blossoms and orange-red fruits are R. *Willmottiae* and *R. multibracteata.* In the former the flowers are usually solitary whereas in the latter they are normally clustered, otherwise they are much alike.

The original Musk Rose *(R. moschata)* appears to have been native of the Pyrenees but has long been lost to cultivation and its name applied to a vigorous climbing Rose *(R. Brunonii)* native of the Himalayas and China whose flowers also have the odor of musk. Of this type of Rose there are half a dozen species native of China and now in cultivation. The hardiest of all is *R. Helenae* named for my wife. This is a strong-growing plant that will make arching canes from six to twelve feet long and produces at the end of short shoots large rounded clusters of pure white, delightfully fragrant flowers to be followed by orange to red-colored fruits. The flowers, each about one and one-half inches in diameter, have conspicuous yellow anthers and are singularly beautiful. This Rose grows fairly well in the Arnold Arboretum but does much better on the limestone soil of Rochester, New York, where, in fact, it is not

only hardy but flourishes as on its native heath. Closely related but less hardy are *R. Rubus* with hairy leaves, *R. Gentiliana* with larger flowers and lustrous green leaves, glaucous gray on the underside and the robust *R. Soulieana,* with gray stems, gray-green luxuriant foliage and cream-colored flowers.

Wide-spread in the warmer parts of the United States is the Cherokee Rose *(R. laevigata)* and few who bask in the purity of its whiteness realize that it is merely a naturalized plant brought no one knows how or when from China, its real home. Throughout the warmer parts of China there is no more common woody plant than this Rose with its lustrous three-foliolate leaves, large flowers and handsome hips. In eastern China grows the Macartney Rose *(R. bracteata),* which is also naturalized in the southern states. The parent of the Tea, Monthly and Polyantha Roses are also Chinese and the direct ancestors of the old Seven-Sisters and Crimson Rambler is common especially on the foreshores and banks of rivers. And lovely is this wilding, *R. multiflora* var. *cathayensis,* with its large trusses of pure pink flowers with golden anthered stamens. Sprawling on the ground and over rocks, hugging other shrubs in warm embrace or forming of itself a compact bush five to six feet tall, it is in blossom ever

PRAIRIE ROSE, ROSA SETIGERA

graceful and beautiful, more so in fact than many a named garden form derived from it in western gardens. It is perfectly hardy in the Arnold Arboretum, where it flowers freely each summer.

The parents of our Rambler and Wichuraiana Roses *(R. multiflora* and *R. Wichuraiana)* are essentially Japanese though they also grow in southern Korea and possibly in coastal parts of China. Like other species of Wild Roses these plants are very variable in a natural state and in the hands of the hybridist have been most prolific in results. The polished shining leaves of *R. Wichuraiana* and the large trusses of *R. multiflora* have blended well and with color from the blood of the descendants of var. *cathayensis,* Hybrid Perpetuals and others have given in recent years a new class of Roses without which modern gardens would be strangely incomplete today.

One ought to tell of many other Wild Roses—of the common Roses of Europe—the Dog Rose *(R. canina,* the Sweetbriar *(R. eglanteria),* the Austrian Briar *(R. foetida)* and many others but finality is not attempted. My theme may well end with mention of a native species, the Prairie Rose *(R. setigera)* too much neglected in this country. We grow it in the Arnold Arboretum in a bed of irregular shape; the old canes and weak ones are cut out each year in the

spring and the vigorous ones slightly shortened. In early July each year the plants are ablaze with clusters of rosy pink blossoms. It flowers after other species are past blooming which is an additional reason for its place in every garden. Some have called it garish but to me it is right worthy of its native land and one of the loveliest of Wild Roses.

BROOMS

JEWELS FOR ROCKERY OR SUNNY BANK

WHY are the Brooms and their kindred so much neglected in our gardens? Go to Kew's Royal Garden and you will hunger for them. They are shrubs of good habit, abundant of blossom and, so far as I know, possess no bad traits. Lovers of sunshine, King Sol has painted them yellow and gold to reflect his own brilliancy. At least a couple of dozen are perfectly hardy in the Arnold Arboretum, and on Long Island and southward the number could be doubled. It is true that a sprig of Genista was the badge of the Plantagenet kings of England but this ought not to cause their banishment from the gardens of even the most thorough going democracy. The Dyer's Weed or Woad-wax *(Genista tinctoria)*, which supplied the early Britons with a yellow dye and mixed with Woad *(Isatis tinctoria)* a green dye, is a pest in parts of Massachusetts near the sea but this should not prohibit its better looking and better behaved brothers and cousins from brightening our gardens with yellow, white and pink from spring until August. Taking a census of the catalogues I find, including tender

sorts, only sixteen species listed for sale so I fear it is merely the old story of—shall I call it ignorance or indifference? At any rate, our nurserymen whose business it is to supply not only our garden's needs but to instruct us into the knowledge of greater variety must shoulder the blame.

The Brooms and their immediate relatives are indeed a very useful class of floriferous shrubs and subshrubs much too little known in American gardens. When rock gardens come into their own these plants will be in great request. Those familiar with the British Isles know how Broom and Gorse glorify common, moor and wayside with golden blossoms for a goodly portion of the year. Some will recall that when Gorse is out of flower kissing is out of fashion, which adage conveys the perennial character of this shrub's blossoming.

The whole group is essentially European with a few members creeping westward into Asia Minor and southward into north Africa and the islands off the coast. The species are widespread in Europe but most abundant in the southern and southwestern parts. Altogether they are the largest and most important class of shrubs and subshrubs that Europe has given to our gardens. Cytisus and Genista are the two largest genera and to these for our purpose

may be added Ulex (Gorse) and Spartium (Spanish Broom).

There is a very strong family resemblance among them in habit of growth, in general appearance and in their flowers, so much so in fact that the generic distinctions are not at all clear to the layman. They are plants of twiggy, broom-like habit with a multitude of slender branches which bear in profusion yellow, white, pink or red-purple, but mostly yellow blossoms. The flowers are shaped like those of the Sweet Pea with a boat-shaped keel, gay wings and flaunting standard. No plants could be more free flowering than these Brooms. The leafage is small, often scant, in many it is quite wanting when the green shoots function in their stead. They are, truly speaking, evergreen plants and this should warn those who wish to grow them in New England that protection from the sun in late February and March is essential.

Several of the sorts are prostrate in habit forming neat hummock-like masses sprawling over the ground. These are ideal for planting on boulders or in the rockery. Some are large twiggy bushes from twelve to fifteen feet tall and much through, but the majority are compact bushes from two to four feet high, neat in appearance throughout the year. They

are in abundant bloom from early spring until August and most of them set seed freely. Seed is an excellent means of increasing these plants but some like *Cytisus Ardoinii* are very susceptible to foreign pollen and hybridize freely. As will be shown later some of the very finest garden sorts have originated this way as chance hybrids. These hybrids must be propagated from cuttings and this is a good method to practice with all of them. Firm, nearly ripe wood inserted in early August is best. They do not transplant readily and this should be done when the plants are small. Nurserymen should maintain a stock in pots for they can be planted with success at any season when the ground is not frozen.

Brooms and their kindred are sun-loving plants and perfect air and root drainage are essential to their well-being. A sandy loam from which the water can seep freely away is ideal. They do not object to the best of loam provided the subsoil is gravelly but are happy in quite poor garden soil. Their roots are furnished with nodules rich in nitrifying bacteria and so they do not exhaust but, on the contrary, tend to enrich the soil in which they grow. They are excellent groundcovers and nurses for the choicer shrubs but are impatient of overhead shade except of a very

SPIKE BROOM. CYTISUS NIGRICANS

light character. Drought they really enjoy but a water-logged condition spells death.

On account of their floriferous character many of them are short lived. The taller sorts are apt to become straggly and untidy in appearance if not severely pruned. They bear the knife most kindly and so soon as flowering is over can be cut hard back to maintain the desired shape and size. Provided they be given full exposure to sun and wind and good root drainage all of them can be grown somewhere on the Atlantic seaboard from Georgia to Massachusetts, and in California the most tender sorts flourish like the proverbial Fig-tree. Of course, not all can be grown in any one locality but experience in the Arnold Arboretum has shown many supposedly tender species to be hardy enough when rightly placed.

For planting on sunny banks or on top of exposed rocks *Cytisus Ardoinii, C. Beanii, C. decumbens, C. scoparius pendulus* and *C. kewensis* are admirably suited. All five are prostrate with very numerous slender radiating branches which form from a yard to fathom-wide masses hugging the ground. The best of the lot, I think, is *C. Beanii,* a chance hybrid between *C. Ardoinii* and *C. purgans,* with large deep golden yellow flowers borne singly or in pairs from each joint of the previous year's growth.

So freely does this plant blossom that scarcely anything is visible but sprays of flowers. It is quite hardy in the Arnold Arboretum. Its part parent, *C. Ardoinii,* has similar flowers but is less hardy. This is native of the Maritime Alps and is a singularly pretty plant which hybridizes freely and must be propagated from cuttings to keep pure. *C. decumbens* has bright yellow flowers clustered in sprays along the shoots. It is perhaps the most thoroughly prostrate of all the Brooms and in May and June is gay with blossoms. For growing on shelves in the rockery nothing is better than *C. kewensis* with cream to sulphur-yellow blossoms. It is a hybrid between *C. Ardoinii* and *C. albus* which flowers in May. The Dalmatian Broom *(Genista dalmatica)* is also splendid for bank and rockery and will tolerate moderate shade. It grows only a few inches high and forms dense tufts a couple of feet through. In June and July each shoot terminates in two-inch long racemes of golden yellow flowers. It is a very dainty and charming plant. A prostrate plant with flattened winged stems and racemes of yellow blossoms in June is *G. sagittalis,* which is both hardy and accommodating. Another pleasing little plant which forms neat spreading tufts is *Dorycnium hirsutum.* Though scarcely woody it is very hardy, has hairy

stems and leaves and clustered heads of white tinged with pink flowers. It has proved quite hardy in the Arnold Arboretum and is a very attractive little plant.

Forming tufted masses of stems from ten to twenty-four inches tall and a foot or more through there are several species of Cytisus and half a dozen of Genista. All are neat in appearance and furnished in season with abundance of blossom. A splendid member of the group is the Purple Broom *(C. purpureus)* which in May is alive with rose-purple blossoms. Its stems are a foot and a half tall, spreading into irregular-shaped mats a fathom wide. This is one of the most useful as well as most hardy of all Brooms. A very distinct plant is *C. leucanthus* with close-packed heads of cream-colored flowers terminating foot-long erect spreading stems. It is one of the hardiest of the Brooms at its best in June and July but blooms intermittingly until October. Two other hardy sorts are *C. hirsutus* and *C. Heuffelii* with yellow flowers. In the last-named they are borne in dense terminal heads; in *C. hirsutus* they form axillary racemes.

The Genistas of this low-growing group *(G. anglica, G. anxantica, G. pilosa, G. tinctoria, G. horrida* and *G. hispanica)* all have yellow flowers. Perhaps

the best is the Spanish Gorse *(G. hispanica)* whose wealth of yellow blossoms make a gorgeous display in late May and June. It is a green, spiny plant of dense compact habit whose every twig terminates in a head of flowers. Planted several together it will form drifts of yellow yards across. Similar but of silvery gray hue is the cushion-like *G. horrida,* which also hails from Spain. The Neapolitan Broom *(G. anxantica)* and the Woad-wax *(G. tinctoria)* are closely related plants of less value in the garden than others. The same remark applies to the Needle Furze *(G. anglica),* but *G. pilosa* is a pretty little plant which forms tangled masses of bright yellow a foot or more tall.

Coming to the next group which grows into broom-like masses from two to six feet tall there are several of surpassing merit. The hardiest is *C. nigricans,* a neat shrub from three to five feet tall of compact habit with every shoot in late July and August terminating in six-inch long erect racemes of bright yellow flowers. In *C. purgans* and *C. ratisbonensis* the flowers are produced in pairs from the joints of the previous season's growth during May. So too, are they in the hybrid *C. versicolor* which has yellow suffused with purple blossoms. In *C. supinus* the yellow flowers are clustered at the ends of the

shoots. Full half a dozen Genistas belong in this group of which *G. radiata,* with spiny opposite branches and heads of yellow and *G. germanica* with racemose flowers, are perhaps the most hardy. Both are round-topped bushes seldom more than three feet tall. Better than either of these above is *G. glabrescens* which forms a dense mass and produces its yellow blossoms freely from the clustered joints of last year's shoots. It is often known as *Cytisus glabrescens* and is quite hardy in the Arnold Arboretum. All these medium-sized Brooms are good subjects for the open border and for massing to give broad masses of color.

The taller growing Brooms range from eight to fifteen feet in height and naturally suffer more from March suns than their dwarfer relatives. Moreover, more constant pruning is necessary or they become straggly and untidy. Like all their clan they are best planted several together to form bold clumps. The hardiest of this group is the old favorite White Broom *(Cytisus albus)* of which there are several forms. This has a multitude of very slender branches which cover themselves in late spring with white blossoms. A supposed hybrid of this and *C. purgans* is the Warminster Broom *(C. praecox)* which has a similar besom-like habit but sulphur-yellow

flowers abundantly produced in May. The fragrance of the Broom is rather heavy and unpleasant and the plant is best kept at some distance from the house.

The common Broom *(C. scoparius)* which makes the moors, commons and roadsides of Britain glow with yellow through May and June is well known and appreciated. Here and there on the New England coast it is naturalized. There are several varieties including the Moonlight Broom (var. *sulphureus*) of lower, more compact habit and lovely sulphur-yellow flowers. The aristocrat of all, however, is the Paradise Broom (var. *Andreanus*) which was discovered wild in Normandy about 1884. This has the wings of the flower a brownish crimson and the standard yellow stained with the same rich color. There are several forms of this handsome Broom and one named Firefly has very highly colored blossoms. The Paradise Broom is a twiggy mass of green some five or six feet tall and as much in diameter and about as hardy as the common Broom. It should be increased by cuttings or by grafting as it does not come true from seed.

A beautiful hybrid of Andre's Broom and *C. albus* is *C. Dallimorei* which was raised in the Royal Gardens, Kew, in 1900. This has abundant flowers,

WHITE-FLOWERED CYTISUS LEUCANTHUS

suffused with lovely shades of rosy pink deepening in the wings to crimson. Of erect, twiggy habit it grows from six to eight feet tall and is among the hardiest sort listed by our nurserymen. Beautiful is the Etna Broom *(Genista aetnensis)* which is the tallest of all the species, being sometimes twenty feet high and flowers in July and August. The flowers are golden yellow and very showy. It ought to be hardy along the coast as far north as Massachusetts but we have failed with it in the Arnold Arboretum. Another Broom which has disappointed us in hardiness is *G. cinerea* which grows some ten feet tall, with masses of whip-like branches and bright yellow flowers in late June and July. For climates warmer than that of New England the Madeira Broom *(G. maderiensis* or *G. virgata)* is to be strongly recommended. This is a wide-spreading bushy plant some twelve feet tall with short racemes of clear yellow flowers in great plenty throughout late June and July and intermittently until October. It bears shade moderately well, will grow among rough grass and benefits from hard pruning.

For California and other warm states the fragrant blossomed *Cytisus racemosus* and *C. canariensis,* so much grown in the conservatories of New England and elsewhere, are splendid and well appreciated

shrubs. These sun-loving plants with warm honeyed fragrance have plenteous foliage which is lacking in most of the Brooms mentioned in this article.

Rather gaunt of habit is the Spanish Broom *(Spartium junceum)* with erect, rush-like, smooth, dark green stems devoid of leaves. It grows from six to twelve feet high and on the current season's shoots in July and August produces glowing yellow fragrant blossoms in terminal, foot-tall racemes. The flowers are larger than those of other Brooms and the plant continues to put them forth until September. Unfortunately, it requires a climate less cold than that of New England. For the warmer states it is splendid for massing in dry hot places but the knife should be freely used every spring before growth starts. A native of southern Europe it has been cultivated since the middle of the Sixteenth Century but it could to advantage be more freely used in American gardens where climate admits.

The common Gorse *(Ulex europaeus)* is too coarse and spiny a plant for ordinary gardens but in the wild garden and for keeping out undesirables it has its uses. When in blossom, which is from February until early May, it provides one of the floral sights of Europe where it covers hundreds of square miles of moorland, common and heath. Sheep and cattle

fatten on its young shoots and in the hot days of summer the popping of its fruits as they explode scattering the seeds startles the uninformed. A better plant for the vicinity of houses is the double-flowered Gorse (var. *plenus*) which is splendid for arid hungry soils and for covering dry banks. It is more slow growing than the common Gorse and the flowers last longer.

The dwarf Gorses *(Ulex nanus* and *U. gallii)* are autumn-flowering shrubs and on this account valuable. Neither of them exceed two feet in height and are of low, dense habit. The flowers are rich yellow, about half the size of those of the common Gorse and freely produced. Both are useful garden plants which are much too infrequently seen. Gorse, like its relatives, the Brooms, should be planted from pots since it transplants with difficulty from open ground.

COTONEASTERS

SHRUBS OF MANY VIRTUES

OTONEASTER is an Old World group of shrubs which recent plant hunting work in the Orient has greatly enriched. It is a genus in which I am particularly interested and take pardonable pride in the fact that of the thirty-eight species and varieties listed in *Standardized Plant Names* I am responsible for nineteen. Of the more complete list given in Rehder's *Manual of Cultivated Trees and Shrubs* it has been my good fortune to have introduced into gardens thirty-four of the seventy-seven kinds enumerated.

As a group, Cotoneasters possess many virtues of outstanding merit. In point of fact they rank with the indispensables in garden making. And, moreover, their uses are not restricted to any one part of the country for among them are sorts for the northeastern states, for the middle states, for California and the warm south. They are closely related to the Hawthorns but have entire leaves and no thorns. The flowers are either white or pinkish and borne few or many together in clusters along the branches. Occasionally they are solitary. The plants are in blos-

som from May to the end of June; in the fall they are heavily burdened with red or black, rarely brown-purple, fruits, either globose, oval or egg-shape, which in many sorts remain on the bushes with little loss of brilliancy far into the winter. Some of the deciduous species boast fine autumn coloring while the evergreen kinds are always an attractive green.

Uniformity may in general characterize their flowers and fruit but Cotoneasters are remarkably rich in diversity of form and habit of growth, in size, in the arrangement of their branches and in the tracery of their branchlets. Some like *C. Dammeri* are prostrate groundcovers, rooting as they trail over the soil; others like *C. frigida* are trees of moderate size. Some *(C. microphylla, C. adpressa* and *C. horizontalis)* are especially well suited for the rockery or for planting on or against walls and stonework. A majority, however, are best as specimens on lawn and in border where they have room to display to advantage their graceful habit of growth, their beauty of blossom and fruit. For the cold parts of the country such as *C. lucida* and *C. acutifolia* are excellent for making hedges and in warmer parts, so too, is *C. Simonsii.*

The hardiest sorts all lose their leaves in the autumn but there are a large number of evergreen spe-

cies, much at home in California and other lands blessed with a mild climate. Two of the most popular shrubs in California are *Cotoneaster pannosa* and *C. Franchetii,* both native of southwestern China. The hardiest of the evergreen species is *C. salicifolia* closely followed by *C. glabrata* which flourish amazingly from Newport, Rhode Island, south to Georgia. All the Cotoneasters are handsome in fruit but the red-fruited group is the most attractive. A limited number of which *C. hupehensis, C. soongorica* and *C. turbinata* may be instanced are as beautiful in flower as any Spiraea. All in all these plants have many claims for places in every garden, large or small.

Related to the Crabapples and Hawthorns the Cotoneasters are likewise lovers of sun and wind and demand full exposure to the elements. A well-drained situation and a loamy soil are other essentials and if lime be present so much the better. A weak point about the family in general is they do not transplant readily from the open ground, especially the low-growing sorts. Nurserymen now appreciate this fact and are growing them in pots and this is the type of stock which should be sought. Pot-grown dwarf Cotoneasters can be transplanted with assured success and at almost any season of the year. If they have

ROCK-LOVING COTONEASTER HORIZONTALIS

been properly grown and transplanted in nurseries to develop a fibrous root system the larger growing kinds are less particular.

Provided they be planted where they enjoy good air and root drainage few shrubs give returns in beauty of form and fruit equal to Cotoneasters. On poor soil they are quite at home though naturally they relish good food and respond accordingly. In well drained situations exposed to the heavens and all the winds that blow the plants are thrifty, keep free of aphis and scale insects, flower and fruit abundantly, and are a never-failing source of pleasure to the lover of shrubs.

Seeds afford a ready means of propagation although the bulk of the seeds may lay a full year in the ground before germinating. Cuttings of half-ripe wood taken in July and of hard wood in the winter will root freely. Formerly the reprehensible practice of grafting Cotoneasters on Hawthorn and Mountain Ash stocks obtained among nurserymen. The results were disastrous to the purchaser and this indefensible method of propagation has met with the contumely it richly merited. Such work today should place a nurseryman beyond the pale.

In spite of the many uses to which Cotoneasters are admirably adapted, their all-round good qualities

and their suitability to a wide climatic field, they are little appreciated in these United States. However, it is only a question of time and these shrubs of many virtues will be among the most widely planted garden subjects. At the moment not more than half a dozen sorts are properly known among nurserymen and the amateur has had but little chance of getting acquainted with the group at large.

The oldest cultivated among the low-growing sorts is *C. microphylla* to which the applicable name of Rockspray has been given. This is an evergreen species scarcely hardy around Boston, Massachusetts, which makes a broad, uneven hummock sometimes a yard high on the level ground but is best planted on top of stone walls or banks and allowed to trail curtainwise. It has small, glossy, dark green leaves, conspicuous axillary white flowers with pink anthers, and red berries in the fall. A variety with smaller leaves is appropriately named *thymifolia,* another is var. *glacialis;* both are first-class plants for the rockery. The most prostrate of all is *C. Dammeri* or *C. humifusa* as it is commonly called. This is a trailing plant which roots as it creeps over the ground. It has more or less oval, bright green leaves, white flowers and scarlet fruits. In central China, from whence I introduced it into gardens a quarter of

a century ago, it covers areas of windswept mountain slopes and Pheasants—Golden, Reeves and Ringneck—are partial to its fruits. Unfortunately we have not been successful with it in the Arnold Arboretum but a friend on Long Island rejoices in a magnificent carpet of this unique species. For clothing banks, especially those of a gravelly nature, this plant is unusually valuable but it must not be allowed to suffer drought. In California and elsewhere, under the name of *C. Wheeleri,* a low-growing evergreen, red-fruited Cotoneaster is cultivated. The correct name for this is *C. prostrata.* A related trailing species from the Nilghiri Hills in southern India is *C. buxifolia.* The names of the Indian Cotoneasters are much confused and the plants themselves are tender in New England.

Deservedly the most popular of red-fruited Cotoneasters is the Chinese *C. horizontalis,* characterized by its flat sail-like or frondose branching habit. In climates rather milder than that of New England it is sub-evergreen but it is quite hardy although fully deciduous well north of Boston, Massachusetts. In the open border it makes broad, hummock-like, irregular masses a yard high possessed of much character in habit. Planted against a wall—stone for preference—it can with little difficulty be trained to form

a close screen. Placed on top of low walls it grows into an irregular thicket of singular charm. The flowers are abundant, pinkish but not conspicuous; its fruits are about the size of a pea, bright red to scarlet and brilliantly jewel the branches in the dullest days of winter and far into the spring. In addition of the type there is var. *perpusilla* with smaller leaves and var. *Wilsonii* of more even, although loose, habit of growth. Topping a boulder in the rockery or planted in a crevice and allowed to spread itself at will *C. horizontalis* and its forms rank among the most useful, pleasing and decorative shrubs gardens possess.

Somewhat similar, but of close-tufted habit, with larger, thinner leaves and fewer fruits is the pretty *C. adpressa,* also delightful as a rockery plant. Of taller habit and forming neat mounds a yard high with over-lapping branches, which are studded with scarlet berries in the fall and winter, is the newer *C. apiculata,* also of Chinese origin. Taller plants best suited for planting in groups or as individual specimens in the open or among rocks are *C. divaricata* and *C. rotundifolia,* both intricately branched, red-fruited shrubs from five to eight feet high and broad. The first-named is the hardiest and has bright red fruits in clusters, usually of three, produced in amaz-

ing profusion. In *C. rotundifolia* the fruits are larger, usually solitary and long retained on the branches which are flattened and sail-like in appearance. All three have pinkish, inconspicuous flowers and are sub-evergreen in mild climates.

A handsome shrub with arching-spreading branches and clustered scarlet fruit is *C. Dielsiana* or *C. applanata* as it is also called. This will grow fully ten feet tall and as much through with branches arching to the ground. There is a variety *(major)* with larger leaves and another *(elegans)* with coral-red fruits and sub-evergreen foliage. Another good sort is *C. Zabelii* which has slender branches, dull green leaves and bright red hanging fruits. This is a broad shrub growing some six feet high and its foliage turns bright yellow in the autumn. More pleasing than the type is var. *miniata* with orange-scarlet berries.

The great decorative value of Cotoneasters in general is in their fruit but there are several whose beauty of blossom rivals that of the Spiraeas. Three of the best of these are *C. soongorica, C. hupehensis* and *C. multiflora,* all of which have flattened clusters of white Hawthorn-like flowers borne freely all along the stems. The first-named has rigid branches arranged to form a broad, rounded bush from six to ten feet high and more in diameter, gray-green foli-

age, owing to the presence of a covering of hairs and large coral-pink fruits. If the gray-green leaves do not afford sufficient contrast to show off the flowers to advantage ample amends are made in September when the whole plant is necklaced in coral-pink. The fruit is relatively large and so abundantly produced that the stems appear as ropes of beads. The fruit ripens early and falls before the winter sets in but throughout September and October the bush is conspicuous from afar and of exquisite loveliness. The other two *(C. hupehensis* and *C. multiflora)* have dark green leaves and whip-like arching and spreading branches which form fountain-like masses of white in early summer; in the autumn they are strewn with brilliant crimson fruits. Both are very hardy, free-growing shrubs from eight to ten feet high and from ten to fifteen feet through. Combining the qualities of abundant blossom and wealth of brilliant fruits I count *C. soongorica* and *C. hupehensis* two of the most valuable shrubs it has been my privilege to add to northern gardens. If any doubt their usefulness or beauty they have but to visit the Arnold Arboretum and see for themselves.

A graceful shrub with slender branches, pink blossoms and red fruit is *C. rosea,* native of remote Afghanistan but quite hardy in Massachusetts. Fairly

ROPES OF CORAL-PINK, COTONEASTER SOONGORICA

well-known are *C. racemiflora, C. integerrima* and *C. tomentosa,* vigorous growing shrubs with rather large leaves and clustered red fruit. A newcomer from western China is *C. bullata* with its varieties *floribunda* and *macrophylla.* These are shrubs some ten feet tall with ascending branches and relatively large ovate, pointed, deep green leaves much wrinkled above and clustered berries that shine like beads of sealing wax.

The largest of all Cotoneasters is the Himalayan *C. frigida* which is often a tree some twenty-five feet tall with a broad rounded crown. It has dull green, deciduous leaves, each from three to five inches long, more or less oval in shape, flat corymbs of white flowers and rich red fruits. In the fall and early winter the branches are wreathed in broad clusters of colored berries and the whole tree presents a brilliant spectacle. Unfortunately it is tender but for California and gardens from Washington, D. C. southward there is no more beautiful berried tree. Other good Himalyan species for warm temperate climates are *C. acuminata* with red fruits, *C. affinis* and *C. bacillaris* with purple-brown fruits, all large shrubs of good habit.

The black-fruited Cotoneasters have less garden merit than their brethren with red fruit, but *C. mou-*

pinensis and *C. foveolata* are worthy of a place on account of their orange to scarlet autumn-tinted foliage. These are hardy, vigorus shrubs growing from ten to twelve feet tall and as much in diameter with abundant clusters of black fruits. Slender arching stems, lustrous leaves and jet black fruits characterize *C. nitida* and *C. tenuipes,* recent acquisitions from western China.

For the middle states and colder parts of the country in general *C. melanocarpa, C. acutifolia* and *C. lucida* with clustered black fruits are to be recommended. Also they have much merit as hedge plants being of shapely growth, stand clipping well and of iron constitution. For California and warm temperate regions the long known *C. Simonsii* is not only a good shrub but is admirable for hedges. It has red fruits and is sub-evergreen in mild climates. In New Zealand I often admired the well-kept hedges of this useful shrub. Until the advent of many attractive species from China it was the most widely grown Cotoneaster.

Since the present century dawned western China has contributed to gardens a host of useful and beautiful shrubs, noteworthy among them being many evergreen, red-fruited Cotoneasters. California in particular has cause to be thankful for this contribu-

tion. Two of the most prized shrubs grown in the gardens of that favored state today are *Cotoneaster pannosa* and *C. Franchetii,* natives of Yunnan. Both are free-growing slender stemmed shrubs, with arching branches, attaining a height of from eight to fifteen feet and more in diameter with abundance of blossom and fruit. Superior to either with large leathery leaves, dark green and lustrous above and clothed with a gray felt below, and broad clusters of bright red fruits is *C. Harroviana,* also from Yunnan. From the same region of China came *C. amoena* with small leaves crowding stiff-spreading branches and rich-red densely clustered berries. It is a shrub of from five to eight feet high and more in breadth.

The hardiest of the evergreen tall-growing Cotoneasters is *C. salicifolia* of which there are narrow *(floccosa)* and broad-leafed *(rugosa)* varieties. These are handsome shrubs with leaves lustrous above felted with white hairs on the underside and clusters of conspicuous white flowers which are followed by a wealth of small bright red fruits. The many arching, ruddy barked branches sweep the ground and form fountain-like masses of from twelve to eighteen feet in height. From Newport, Rhode Island, south, these plants are perfectly hardy and of their class there are no more useful or desirable shrubs. Almost

equally hardy is *C. glabrata* with oblong, lance-shaped leaves some two to three inches long, bright green and wrinkled above, smooth and pale below. It is a handsome vigorous shrub from twelve to fifteen feet tall with flowers and fruit like those of *C. salicifolia.* Somewhat similar and equally beautiful is *C. rhytidophylla* characterized by its strongly wrinkled leaves heavily felted on the under surface. One of the most floriferous of all is *C. turbinata,* a shrub of elegant habit growing ten feet and more tall, blossoming in July and bearing in autumn clusters of pear-shaped red fruit. I fear that neither this nor the very desirable *C. serotina* and *C. glaucophylla* are in cultivation in this country but they ought to be speedily added to Californian gardens.

There are other evergreen species, all of them worthy, but my list shall end with *C. Henryana,* a tall-growing shrub with pendulous branchlets, large leaves, broad corymbs of white flowers followed by rich crimson fruits. It is of lax habit and rather sparingly branched, and it has the largest leaves of any evergreen Cotoneaster. In autumn when its pendent branches are weighted with crimson berries it is seen to best advantage.

BARBERRIES

SHAPELY OF HABIT, BRILLIANT IN FRUIT AND FOLIAGE

AS ORNAMENTAL shrubs Barberries are worth growing for their beauty of habit, for their foliage and for their fruit. All the deciduous sorts display fine autumnal coloring. Many kinds are valuable as hedge plants and several of the Mahonia group are perfect groundcovers. In general they prefer a warm loamy soil but are by no means fastidious. Propagation by cuttings of fairly ripened wood is moderately easy and seeds germinate freely though the species have a marked tendency to hybridize and produce mongrel races.

There is a strong family likeness among the Barberries. All are shrubs but they vary in size from low plants a foot high to huge bushes twenty feet tall. The leading characteristics are the yellow wood, yellow flowers in parts of three, a red, black or blue-black, globose, oblong or egg-shaped berry containing from one to several seeds. The curious may note that the stamens are irritable and if touched at the base with a fine pointed pencil or pin they spring forward to the stigma. The object of this power is

to insure cross-pollination. A bee in search of honey pushes itself into the flower, sets the stamens in action and becoming itself smeared with pollen carries it away to another flower and deposits it on the stigma.

The true Barberries all have simple leaves which in many species fall in the autumn and in others are retained through the winter; they are armed with spines, often of formidable size and strength, which may be straight and simple as in *B. Thunbergii,* three-partite and trident-like as in the majority of species or much divided and often curved as in *B. actinacantha* and a few others. For the purpose of this essay the group with pinnate leaves, often referred to another genus under the name of Mahonia, may be included. These are all evergreen and without spines.

In this era of quarantine regulations many Barberries are banned from cultivation in certain parts of this country. Some like *B. vulgaris* are the host of one stage in the life-history of a Fungus which causes the rust on Wheat and where this cereal is seriously cultivated it is proper that these host plants should be kept at a safe distance. But there is no need for panic nor panic legislation. The disease known as Rust is nothing new neither is the knowledge that it is intimately associated with the presence of certain

kinds of Barberries. The farmer of China, Europe and America knew this long before the scientist had discovered the Fungus much less worked out its remarkable life history. For we know not how many centuries the pest has been known but Wheat has continued to be none the less successfully grown. Those fond of history may have heard that on January 13, 1755, there was published "The Barberry Law of Massachusetts entitled 'An Act to Prevent Damage to English Grain Arising From Barberry Bushes' "—"Whereas it has been found by experience that blasting of Wheat and other English grains is often occasioned by Barberry bushes to the great loss and damage of the inhabitant of the province:—Be it therefore enacted by the Governor, Council and House of Representatives that whoever, whether community or private person, hath any Barberry bushes standing or growing in his or their land, within any of the towns of this province he or they shall cause the same to be extirpated or destroyed on or before the 13th of June, 1760."

Apparently this law like many others was not lived up to and the extirpation demanded was not carried out for the common Barberry is today plentiful as a naturalized bush throughout Massachusetts, where in the fall season especially it adds beauty to

the countryside. Old Dr. John Brickell, in his queer *Natural History of North Carolina* mentions the Barberry,—indeed two kinds, one with seeds and one without seeds. At first one might think he had reference to *Berberis canadensis,* but he speaks particularly of the "Long, slender, red berries" which would seem to show that he was really talking about the common European Barberry *(B. vulgaris)* and not the Alleghanian *B. canadensis* which has ovoid or subglobose berries. *Brickell's Natural History* was published certainly as early as 1737, and, indeed, there are indications of a still earlier edition, and any way he is said to have compiled most of his information from a still earlier work by one, Lawson. This would seem to carry the history of the Barberry in America back to a somewhat earlier date.

The Alleghanian *B. canadensis* is the only Barberry native of North America east of the Mississippi River. This is a charming plant, known since 1730 yet rarely seen in present-day gardens and difficult to procure. It is of strictly upright habit suckering freely and forming dense clumps of slender shoots each from four to six feet tall. The leaves are more or less obovate, each about an inch long and turn scarlet in the autumn. The flowers are bright yellow, borne in racemes and the small ovoid fruit is scarlet

and remains long on the bush without loss of brilliancy.

Probably the most widely known exotic shrub in this country is *Berberis Thunbergii,* a gift of the Arnold Arboretum to American gardens. This Barberry is native of the mountains of Japan where it was discovered and sent to St. Petersburg Botanic Gardens by the Russian botanist, Carl Maximowicz, in 1864. So long ago as January, 1875, seeds were received from St. Petersburg by the Arnold Arboretum and a few years later plants were freely distributed. Its hardiness, ease of culture and general usefulness has made it one of the most popular shrubs grown in this country. Some contend that it is much too commonly planted but none can deny its great utility. Given room it makes a rounded mass from six to eight feet high and more in diameter. In the spring the arching branches are strung with hanging yellow blossoms and in the autumn with shining scarlet berries. The leaves in fall are varying shades of orange and red to crimson and throughout the winter the fruits glow like jewels and it is no uncommon sight to find them on the bushes well into the following summer—duller in color but still attractive. As a hedge plant this Barberry ranks among the indispensables being easily kept in shape, dense in

habit and well-nigh impenetrable to man and beast, a good green all summer, brilliantly tinted in the fall and lit with lustrous berries throughout the winter. With so many good qualities it is not surprising that this plant has won immense popularity throughout the length and breadth of this land.

But Thunberg's Barberry by no means holds a monopoly of the family's virtues. The genus itself is a large one widely spread through the northern hemisphere and along the Andes to the southern limits of South America. Fully one hundred species are known and probably two-thirds of this number are in cultivation. Many are favorites of several generations of garden lovers, others are newcomers but little known to ordinary folk. Recent plant exploration work in the Orient, which has so greatly enriched our outdoor gardens, has brought a great many new Barberries to our knowledge. On my own travels I have gathered them in many lands from lonely Saghalien to the little-known regions of the Chino-Thibetan borderland; on the summit of lofty Mt. Morrison athwart the Tropic of Cancer in Formosa, on the Nilghiri Hills in southern India and on mountains which straddle the Equator in central Africa. I have added about thirty new species to western gar-

FOUNTAIN-LIKE BERBERIS VERNAE

dens; some of these have little claim on the cultivator, others are acclaimed by experts.

The most beautiful of all Barberries is the hybrid *B. stenophylla* whose parents are two South American species named *B. Darwinii* and *B. empetrifolia.* It is an impenetrable evergreen bush with slender interlacing stems densely clothed with narrow black-green leaves. From the mass of branches every year are produced arching shoots each a foot or more long which in spring are wreathed from end to end with rich golden yellow flowers; in the autumn they are laden with globose berries which are covered with a bluish white waxy bloom. Unfortunately this Barberry is not hardy in New England but in milder climates it grows from eight to twelve feet high and more in diameter, and a well-grown bush is one of the loveliest of spring pictures. It is admirable in any position either as a bush on the lawn, as a covering for steep banks or as a hedge plant when it should be trimmed immediately after it has flowered. In recent years a number of seedlings from this hybrid have been raised and named, some of them very dwarf with dense foliage and rich orange to almost red flowers.

Among the deciduous Barberries I do not think any is more lovely than the common *B. vulgaris,*

whose main stems are erect and arching toward the ends. It is best when the stems are few for the hanging racemes of bright red berries are then most clearly seen. Closely akin to the common Barberry is *B. amurensis* and its variety *japonica,* often called *B. Regeliana,* from northeastern Asia. Both are very hardy vigorous shrubs with hanging clusters of scarlet fruits and bright green leaves which color well in the fall. Another attractive species with pendent racemes of bright red fruit is *B. chinensis* whose name is an egregious misnomer since it is native of the Caucasus region and unknown in China. This is a floriferous shrub growing about six feet high with ascending-arching branches, bright green leaves narrowed at the base and is free fruiting. Of the typical *B. Thunbergii* enough has been said but mention must be made of the compact growing variety *Maximowiczii* and the dwarf var. *minor* familiarly known as the Box Barberry; there is also a useful hybrid with twin fruits named *B. ottawensis.*

A recent debutante of great charm and beauty is *V. Vernae* which I discovered some twenty years ago on the Chino-Thibetan borderland. A green fountain some six feet high and twice that through, this has long slender, bright red branches covered with small, nearly entire leaves; in June the stems

are strung with slender, short racemes of deep yellow flowers and in the autumn with almost translucent salmon-colored round fruits. It opens its blossoms late and in the fall the wealth of fruit weighs down the branches. This rather hides the fruit but on raising the stems the full glory of the bush is disclosed. The delicate salmon shade with the sunlight reflected on the berries produces a singularly pleasing effect. Of the many Barberries it has been my good fortune to discover and introduce *B. Vernae* is my favorite among those which lose their leaves in the fall, and of the hundred different kinds grown in the Arnold Arboretum not one has such a graceful habit.

First of its group to blossom is *B. Dielsiana,* a large broad shrub with erect and slightly arching branches, drooping racemes of flowers and bright red fruits. Another excellent species from China is *B. brachypoda,* also with hanging racemes and characterized by its hairy shoots and leaves. The fruit is scarlet and ellipsoid in shape.

Very distinct is *B. dictyophylla* with white sucker shoots and leaves glaucous on the underside. It is of a loose irregular habit and the contrast in color of white stems and red to crimson autumnal foliage is most attractive. The flowers nestle among the leaves and the bright red fruit is egg-shaped. Quite different is

B. diaphana so dense and trim in habit with not a shoot marring the symmetry of its rounded form. It grows from three to five feet high and twice that through and has relatively large solitary flowers. No Barberry has richer crimson autumnal tints than this, though its near relative *B. circumserrata* with scarlet hues is a good second.

One of the most charming new introductions from China is *B. Wilsonae,* a low-growing species of elegant habit. The stems arch over and hug the ground and the plant is well-suited for banks and rockeries. The leaves, which are small, wedge-shaped and gray-green, assume brilliant tints and are shed normally in the autumn but in warmer climates they persist until the spring. It produces its flowers in clusters among the leaves and the berries are roundish, coral or salmon-red, somewhat translucent and borne in abundance. Much to my regret this Barberry, which I named for my wife, is not properly hardy in Massachusetts. Closely related but of taller growth are *B. Stapfiana* and *B. subcauliata,* characterized by their small gray-green leaves, abundant spines and clustered semi-translucent fruits.

There are so many deciduous-leafed Barberries that outside of Botanic Gardens there is not room to grow them all. All or nearly all are good garden

shrubs, but there is no need to catalogue them at length. The selection given above covers the group and to it may be added *B. aggregata* which is grown in Europe under the name of *B. brevipaniculata.* This is a bush of dense twiggy branches out of which are thrust long whip-like young shoots. The flowers are borne in short erect paniculate clusters toward the ends of the branches and are followed by salmon-red fruits, which are slightly covered with a purple bloom. It is a shrub from four to six feet high and as much through with rather small dull green leaves. A closely related species with longer inflorescence is *B. Prattii.* Both flower and ripen their fruits late in the season.

The group of Barberries with evergreen foliage is extensive but, unfortunately, none is properly hardy in the colder parts of America. The Californian climate is to their liking and a great many sorts grow splendidly in that state. A familiar hedge plant on the Pacific slope is the South American *B. Darwinii* with its spiny, dark glossy green, obovate leaves. This Barberry is of dense habit, grows from six to twelve feet high, has red-brown shoots and drooping racemes of flowers and plum-colored fruits. It is in its greatest beauty when laden with a profusion of golden blossoms but is also attractive in the fall when

bearing a large crop of blue-black berries and occasionally a sprinkling of flowers. In the Arnold Arboretum Darwin's Barberry is with difficulty kept alive through the winter but in California it is an indispensable plant. Another South American species suited to the south and regions west of the Rocky Mountains is *B. buxifolia* with solitary, amber-yellow flowers and globose purple fruits. This is a bush up to twelve feet high of stiff habit and dark green leathery obovate to oblong leaves. It is the first of the true Barberries to open its flower in spring. In its native land, which is Chile to the Straits of Magellan, the fruit is used for conserves.

The hardiest of the evergreen Barberries is *B. Julianae,* which makes a brave and fairly successful fight against New England winters. It is a bush up to eight feet tall with rigid branches and tufted shining green leathery leaves, clustered yellow flowers and bloomy-black egg-shaped fruit. It was my good fortune to discover and introduce this plant into gardens in 1900 from central China. In England it was put in commerce under the erroneous name of *B. Wallichiana* and later has been confused with the equally handsome but much less hardy *B. Sargentiana.*

An unmistakable aristocrat is *B. verruculosa* with

STRUNG WITH SALMON-COLORED FRUITS. BERBERIS VERNAE

its warty shoots, glossy dark green Holly-like leaves, white on the underside. It is a low shrub from two to four feet high with overlapping branches and compact habit. On this account it is perfect for the rockery and for places where dwarf shrubs are needed. It is almost hardy in the Arnold Arboretum and is my favorite of the evergreen Barberries discovered and introduced by myself. A closely related species but easily distinguished by its perfectly smooth shoots is *B. candidula* also from China and well worth a place in any garden where the climate is milder than in Massachusetts. Distinct in habit is *B. Gagnepainii* with erect and arching stems and narrow dull green spiny foliage, clustered flowers and blue-black egg-shaped fruit. It is very floriferous and thrives to perfection in California and in the British Isles. Very distinct in appearance is *B. triacanthophora* with twiggy, erect stems and slender, arching, reddish brown branchlets, crowded with clustered, narrow lance-shaped leaves, lustrous dark green on the upper and grayish white on the undersurface with a few spiny teeth on the margin. The flowers, yellowish suffused with salmon, are borne on thread-like stalks and are sparingly followed by lustrous black fruits. In a sheltered place it has proved almost hardy in the Arnold Arboretum and down on

Long Island it flourishes. It is a rare plant, native of the margins of thickets and woodlands in western China from whence I introduced it in 1907. A very graceful and pleasing plant, this evergreen Barberry ought to be widely known.

On the Pacific Slope are growing many other fine evergreen Barberries including such as *B. Sargentiana, B. levis, B. atrocarpa, B. Bergmanniana* and other Chinese species, but this account may close with mention to *B. hakeoides,* remarkable for its profusion of blossoms. This is a Chilean species of rather ungainly habit, often twelve feet tall with stalked or sessile spiny leaves, more or less rounded but very variable in size. The flowers are borne in dense globose clusters all along the previous season's branches and the fruit is blue-black. This plant is, of course, tender but is well-suited to the climate of California and other warm states.

The group of pinnate-leafed Barberries, known as Mahonia, is an extensive one but only a few species are in general cultivation. All are evergreen and none too hardy. The best known and most useful is *M. Aquifolium,* the Oregon-grape, whose lustrous burnished foliage and rich winter tints have won for it wide favoritism. Spreading rapidly by means of underground stems, it soon makes a good ground-

cover. The stems grow from one to four feet tall and have terminal fascicles of attractive yellow flowers which are followed by bunches of bloomy-black fruits. It does well as far north as in and around Montreal where a good winter covering of snow prevails. Of equal hardiness is the dwarf *M. repens* with gray-green foliage, similar flower and fruit, which is also a good carpet and a useful plant for the rockery. More vigorous but less hardy are *M. japonica* and *M. Bealii* natives of the Orient with long, thick, leathery leaves, pale on the underside. Both are well suited to the climate of California and other warm regions.

A curious but very hardy evergreen is *Mahoberberis Neubertii,* widely but erroneously known as *Berberis ilicifolia,* a hybrid between the Oregon-grape and the common Barberry. It is an upright growing shrub from three to six feet tall with rigid branches and dull green, spiny leaves of variable size and form. It seldom flowers much less fruits being decidedly mulish in these matters, but for its extreme hardiness this hybrid is a decidedly useful plant for northern gardens.

MOCKORANGES

RICH IN FRAGRANCE AND WEALTH OF BLOSSOM

FRAGRANCE was ever a virtue much sought after among flowers and is appreciated wherever they are loved and grown. In Philadelphus we enjoy a group, some members of which are among the most redolent denizens of our gardens. The scent of the old-fashioned *P. coronarius,* the original Syringa or Mockorange, is reminiscent of orange blossoms being sweet but heavy especially in the evening, and should be placed at some distance from the house. As a matter of fact, fragrant flowers, like certain colors, require to be carefully placed. Properly they should be planted in positions away from the house in such manner that the odor may be caught occasionally as it drifts in from the garden. There is a variety of scents among the different Philadelphus and people with an acute sense of smell can pick out a number of the sorts by their odor alone. The flowers of the charming small-leafed *P. microphyllus* have a powerful odor of quince and melon fruits delightfully mixed. The hybrid *P. erectus* emits the delectable perfume of pineapple and orange-blossom combined.

The Chinese *P. incanus* has the odor of English Hawthorn, whereas the flowers of the graceful *P. purpurascens* have the fragrance of Sweet Peas, and the odor of Sweet Vernal Grass pervades the flowers of *P. sericanthus*. The quality of fragrance depends not a little on the weather and time of the day—being most pronounced in the early morning and in the evening. The redolence is changeable, elusive, alluring and a few Philadelphus bushes on a warm evening in June will fill the air with rich scents conjuring up memories of nights in tropic lands.

Philadelphus possess no autumn beauty of leaf or fruit, they are ordinary in habit but abundantly floriferous. In the Arnold Arboretum their season lasts over six weeks, the first to bloom being *P. Schrenkii* var. *Jackii* and *P. hirsutus,* which open blossoms during the last week of May. Last to flower is the hybrid *P. insignis* in mid-July. June is the month, however, when they cloud the gardens with white.

In habit Philadelphus are all shrubs; some like *P. microphyllus* form low-growing fountain-like masses not exceeding four feet in height. From this they vary to tree-like bushes like *P. latifolius,* which is sometimes twenty to twenty-five feet tall. For their proper growth a good, well-drained, loamy soil is necessary and they do not object to lime. An

added virtue is that a number of them will withstand overhead shade better than the rank and file of flowering shrubs. The stronger growing sorts may be used as a screen or may be planted on the edge of woods and in glades where they will produce abundant blossoms. Also they may be planted as specimens where if given room to develop they are shapely in habit and good to look upon. Many of them may be grown to great effect on banks and behind low walls, also the low-growing sorts, including the majority of the descendants of *P. Lemoinei,* may be planted in mixed flower borders and kept where they belong in size by judicious pruning.

Philadelphus all flower from the wood made the previous season so any pruning in the spring of the year is destructive to blossoms. It is after they have bloomed — immediately afterward — that pruning should be done. In the larger growing sorts this should consist of cutting out old, decrepit wood, especially that from the center of the bush so as to emit light into the heart of the plant and keep it rounded in habit. For general garden purposes the Lemoinei Hybrids are plants of first quality and these especially demand pruning so soon as the flowers are over. They are low-growing bushes with twiggy stems aplenty and in June cataracts of fra-

grant blossoms. Each year the plants send up from the base young shoots in great quantity. It is these that should be nourished for blossoming the next season. So soon as the wealth of blossom is over cut away, close to the ground, stems that have bloomed and allow the young ascending shoots to get air and food for it is these that next year will give a crop of flowers.

The genus is found in the temperate regions of North America, Europe and Asia, and with the exception of the Mexican *P. Coulteri* all the species have white or yellowish white blossoms. What we may call the original member of the genus *(P. coronarius)* has been cultivated from very early times. Native of southeastern Europe and Asia Minor, its strong fragrance, probably, made it a favorite with the Greeks and Romans. Later, when the Lilac was brought into cultivation the two plants were confused under the name of Syringa and this confusion exists today in the popular mind.

The old fashioned Syringa or Mockorange is really one of the most interesting of garden shrubs. When it was first cultivated we do not know. It is mentioned in some of the earliest of printed books, and quite early in the Sixteenth Century it was in cultivation in Belgium, in Germany and in England. That

grand old gardener, Gerard, in 1597 knew and loved it well although he found its fragrance too strong. If the Mockorange could speak what an interesting story it could tell of garden making among European nations. With those of English tongue it has been a familiar plant since the art of gardening had its genesis among them. It was one of the first plants brought to this country and one that has been carried far and wide by settlers. It is to be found here, there and everywhere in old gardens of New England and especially on Cape Cod, Massachusetts. It flowers during the first half of June and has cream-colored blossoms in erect cymose clusters. Doubtless its fragrance had much to do with its popularity and, although surpassed in beauty by a number of other Mockoranges, it remains, today, the most sweetly scented of them all. Its double-flowered variety *duplex* was known in Germany so long ago as 1613 and is one of the first double flowered garden shrubs recorded as growing in northern gardens. In our enthusiasm for the wonderful hybrids created by Lemoine and the many new species discovered in this and other lands, we should not forget the grand old *P. coronarius,* a garden companion associated with our race from remote antiquity. If there be merit in lineage then this is certainly an aristocrat which

MOCKORANGE, PHILADELPHUS AVALANCHE

we should view with the reverent respect due to age, merit and quality.

The remote mountains of western China have added a number of different Philadelphus to gardens during recent times. All of them have fragrant blossoms and are good garden shrubs of medium size. Among the best is *P. Magdalenae,* a handsome free-flowering shrub with spreading branches and one-sided, seven to eleven-flowered racemes. The inflorescence is thrust forward and the flowers, which are bell-shaped, hang downward. They have the sweet fragrance of Vernal Grass *(Anthoxanthum odoratum)* or of new mown hay. A species with larger, more spreading flowers emitting a similar fragrance is *P. sericanthus.* Another is *P. subcanus* with longer racemes and slightly larger flowers, the odor of which suggests that of Lemon-scented Verbena. A late blooming sort is *P. incanus,* a rounded shrub with blossoms scented like the English Hawthorn. The most pleasing of the newer Chinese species is *P. purpurascens,* which it was my good fortune to discover on the mountains of western China some twenty years ago. This is a shrub from six to ten feet tall, with arching stems and ascending racemose clusters of Deutzia-like flowers. The blossoms are cupped, rather small, possessed of a purplish calyx

and lemon-colored anthers and have the delightful fragrance of Sweet Peas. The contrast between the snow-white petals and the colored calyx adds distinction to this plant. It is possibly the best of the Asiatic Mockoranges.

The first American species of Philadelphus to be cultivated in Europe was *P. inodorus,* a tall, much-branched shrub, often fifteen feet high, with arching branches and large pure white flowers without any odor. It was cultivated by Philip Miller in the Apothecaries Garden in Chelsea in 1738. Catesby, in 1743, figured it in volume II. (t. 84) of his *Natural History of Carolina* and states that the only tree of the kind he saw was growing on the bank of the Savannah River near its cataracts. Since those early days a large number of new species have been discovered and introduced into gardens.

Many of the American species are remarkable for their vigorous growth and handsome, cupped, scentless flowers with waxy petals and prominent deep yellow stamens. Mention has been made of *P. inodorus;* related to it is *P. grandiflorus* with large flowers, solitary or in clusters of three at the end of a short leafy shoot, each flower about one and one-half inches across. Similar with more lustrous foliage and pointed petals is *P. laxus.* The tall growing *P. lati-*

folius is one of the finest and noblest of the whole Mockorange family and has ovate leaves, each two to five inches long and half as wide, and racemose flowers, each one and three-quarters to two inches across. A similar species also with scentless flowers is *P. pubescens.* In this plant the flowers are somewhat hidden by the foliage. The above are all natives of eastern North America but the west has also contributed quite a number of species. Prominent among these is *P. Gordonianus,* a large, round-topped shrub, sometimes fifteen feet tall, with flowers, each from one and one-half to two inches broad, collected seven to eleven together into dense racemes. It is a very profuse bloomer with spreading lateral branches forming a shapely handsome bush. Another, found from British Columbia to California and one of the most elegant and floriferous of the tall-growing species, is *P. Lewisii.* This also has scentless flowers, each one and one-half inches across, borne five to nine together in racemes.

A dainty princess of the Mockorange family is *P. argyrocalyx,* native of New Mexico, which was introduced into the Arnold Arboretum by Alfred Rehder in 1916. In habit this is a loose, straggling shrub about four feet tall, with slender stems, reddish purple when young, and rather thick, ovate,

lance-shaped entire leaves, lustrous above and gray below, and solitary saucer-shaped flowers, each one inch across. The petals are overlapping, pure white enclosing a mass of yellowish gray stamens and supported by a purplish calyx densely clothed with soft gray hairs. The flowers have the delicious odor of ripe pineapples and are borne singly at the end of short shoots along the whole length of the stems which are transformed into elegant sprays of blossom. Although native of New Mexico this has proved perfectly hardy in the Arnold Arboretum and is decidedly a great acquisition.

In the realm of shrubs one of the greatest gifts to northern gardens is *P. microphyllus,* native of the Rocky Mountains from southern Colorado to Arizona. First discovered so long ago as 1847 it was introduced into cultivation by T. S. Brandegee who sent seeds to the Arnold Arboretum in 1877. It is one of the most distinct of the Mockoranges, being of bushy, twiggy habit, scarcely four feet in height, with an abundance of slender but rigid stems, small, ovate, pointed, not toothed, bright green leaves.

The flowers have a pleasant fruity fragrance suggestive of ripe quinces. They are pure white, each about an inch across, produced singly at the ends of lateral branches in such numbers as to transform the

whole stem into a plume of blossom. Unfortunately it is not very hardy in the Arnold Arboretum.

A good garden shrub is this Rocky Mountain Mockorange but it is as part parent of the wonderful race of hybrids raised by Lemoine, that it claims our admiration. The first of these hybrids resulted from crossing *P. microphyllus* and *P. coronarius* in 1884; the product was fittingly named *P. Lemoinei*. It proved to be one of the greatest successes ever achieved by the hybridizers' art, the forerunner of a new and distinct type of garden Philadelphus and the first of a beautiful race of summer-flowering plants. By crossing and intercrossing this hybrid with other species and by selecting seedlings Lemoine has endowed gardens with a wonderful race of low-growing shrubs whose floriferousness surpasses that of any of the species. What we may term the Lemoinei Hybrids all agree in having slender stems which in June are weighted down with fragrant blossoms. Among the best of these may be mentioned Avalanche, Candelabre, Erectus, Mont blanc, Gerbe de neige, Favorite, Pavillon blanc all with single flowers; Boule d'argent, Albatre, Manteau d'hermine with double flowers.

More vigorous and upright in habit and mostly with semi-double flowers is another group of Le-

moine's hybrids named *P. virginalis.* The extra vigor and difference in habit is probably due to them having the old hybrid *P. nivalis* and its semi-double form *(plenus)* as part parents. Virginal, the type, has flowers each from one and one-half to two inches across borne in dense five to seven-flowered racemes. The flowers are sweetly fragrant, of purest white and produced in utmost profusion on ascending spreading shoots. Argentine, Glacier, Bouquet blanc and others of the same race are all first-class garden shrubs. Another group of Lemoine's Hybrids, of which *P. grandiflorus* is probably a part parent, has been named *P. cymosus,* and here belong such lovely things as Conquete, Atlas, Mer de glace, Rosace, Voie lactée, Nuée blanche and Perle blanche all with single flowers; Bannière with semi-double flowers and Norma with flowers either single or double. The hybrid *P. Lemoinei* and all its descendants are hardier than the parent *P. microphyllus,* and no group of shrubs more delightful, more floriferous, more fragrant and more worthwhile has been raised by the hand of man in the history of gardening.

There is but one species of Philadelphus with colored flowers. This is *P. Coulteri,* a Mexican species, not hardy in Massachusetts. Lemoine crossing this and *P. Lemoinei* produced a group, typified by

SEMI-DOUBLE PHILADELPHUS VIRGINAL

P. purpureo-maculatus, in which a reddish purple spot or splash is more or less prominent at the base of each petal. Occasionally it is wanting. Of this hybrid group the best known sorts are Etoile rose, Fantaisie, Nuage rose, Oeil de pourpre, Romeo, Sirene, Surprise, Amalthea and Sybille. Unfortunately they inherit the tenderness of their parent *P. Coulteri* and are not perfectly hardy in the Arnold Arboretum, but from Cape Cod south, where influence of the Gulf Stream is apparent, these should be quite happy. They are low-growing, slender stemmed plants of great beauty, which can be used in the same situations and for the same purpose as *P. Lemoinei.* Indeed, for rockeries and for planting amongst boulders all the Lemoine Hybrids are wonderfully well-fitted.

The species of Philadelphus hybridize freely among themselves and several of the finest sorts in cultivation have originated as chance hybrids. One of the first of these to attract attention was *P. insignis,* more often called Souvenir de Billiard, in memory of the Frenchman in whose garden, about 1870, it was found. It is a vigorous bush, growing some ten to twelve feet tall, with pure white, cupped blossoms, each more than an inch across, produced during the first and second weeks of July, in large terminal pan-

icles of fifteen to twenty sweetly perfumed flowers. Although cultivated for more than fifty years it is not so much grown in gardens as its merits deserve. It is certainly one of the most attractive of the Mockoranges, distinct in its many flowered inflorescence, its lustrous green leaves and cupped flowers with overlapping petals. It is the latest of the Philadelphus to blossom, winding up a season which began in late May with the American *P. hirsutus* and the Oriental *P. Schrenkii* var. *Jackii*. The end of June sees another handsome hybrid of unknown origin in full bloom. This is *P. monstrosus*, one of the most vigorous growing of all the Mockoranges, forming a bush of tree-like habit some fifteen to twenty feet tall, with ascending-spreading branches richly dowered with long clusters of flowers, each blossom one inch and a half across.

An attractive Mockorange of unknown origin is *P. Falconeri*, which is remarkable for its narrow ascending-spreading, somewhat fluted petals. This is a tall growing sort with slender branches and cymose clusters of sweetly fragrant flowers. The character of its petals make it distinct among all the numerous Mockorange tribe. There are many other hybrids of doubtful origin including the handsome *P. Zeyheri*, *P. magnificus* and *P. floribundus*, but this list may

close with *P. splendens,* perhaps the handsomest of the tall-growing hybrid group. Originated as a chance hybrid in the Arnold Arboretum it is possibly a cross of *P. grandiflorus* and *P. Gordonianus.* But, whatever its parentage, it is a magnificent garden plant with stout, ascending-spreading stems, dark green leaves and bold erect clusters of snow-white flowers, each one and one-half to two inches in diameter, in the centre of which nestle masses of prominent yellow stamens. This Mockorange has a slight but pleasant odor. It blooms about mid-season when its wealth of blossoms almost hide the foliage.

HONEYSUCKLES

BUSH AND VINE

HONEYSUCKLES and fragrance are inseparably associated in our minds and when we think of them memory calls up and visualizes those with twining stems, clustered bunches of tubular, vari-colored flowers rich with honeyed scent haunted throughout the summer with darting Humming Birds and buzzing Bees. Often they recall some old homestead with porch and roof dowered with an unruly tangle of growth, the air filled in the cool of the morning and evening with intoxicating fragrance, a balm of peace and content enfolding the whole scene. Or maybe they bring back memories of some woodland stroll where cool air laden with perfume gave zest to the passing hour. But always it is the delectable sweet odor memory conjures forth. Surely plants which leave such vivid fragrant memories are worthy of intimate acquaintance.

The Honeysuckle or Lonicera family is a very large one and some members at any rate are suitable for gardens anywhere in this country whether they be in the cold north or warm south. The climbing

section or Woodbines has been alluded to but there is a larger group of bushy habit less blessed with fragrance perhaps but extraordinarily productive of flowers and brightly colored fruits. And among both climbing and bush sorts are kinds with evergreen foliage.

The climbing Honeysuckles are mainly woodland plants thriving best where their roots are sheltered and the soil cool. Also they are happiest when the air is more or less laden with moisture and for this reason flourish by the seashore. The bush Honeysuckles in general love the sunshine and by this token give much greater returns and are far better garden plants in this country than in the British Isles. Indeed, some like the Tatarian or Fly Honeysuckles are among the most satisfactory shrubs the gardens of the colder parts of this continent possess. One evergreen sort at least *(Lonicera nitida)* is proving a quick-growing hedge plant of exceptional merit in California and other mild parts of this country.

Handsomest of the Woodbines hardy in New England is *L. tragophylla* which thrives at Bar Harbor, Maine. When perfectly happy in cool deep loam and partial shade this plant will twine over bushes and trees, trellises and porches twenty feet high. The flowers are bright yellow, each from three to

three and one-half inches long and borne ten to twenty together in a terminal head at the end of the branchlets. A large tangle of this Honeysuckle in full bloom is a sight to be remembered. Like its relatives it does not like transplanting and resents severe pruning. It is one of those plants best left to indulge its own peculiar whims. Native of central China this Woodbine was one of the plants I was privileged to introduce into western gardens in 1900.

Deep yellow to orange-yellow and six inches long are the tubular flowers of *L. Hildebrandiana* from northern Burmah. This is a vigorous vine that will grow thirty feet tall and has large shining evergreen leaves and enormous flowers from ten to fifteen together in terminal heads. But alas! only those who garden in southern California and in Florida have any hope of growing this giant in outdoor gardens. It should be an acquisition to such gardens and to those of Honolulu and Cuba. I have seen it flourishing at Ootacamund in southern India.

Hardier but demanding a mild climate such as that around Santa Barbara in California is the Mediterranean Woodbine *L. etrusca*. It is a strong growing vine with fragrant blossoms produced twenty to forty together in stalked clusters at the ends of slen-

CHINESE WOODBINE. LONICERA TRAGOPHYLLA

der branchlets. The clusters are both terminal and axillary and so abundantly produced from late June onwards as to dower the plant in fragrant plumes. The flowers, each nearly two inches long, are slender and at first yellowish suffused with red they become clear yellow with age. Where the climate is to its liking it is perhaps the most gorgeously beautiful of its class. A hybrid of this and the Goat Woodbine *(L. Caprifolium)* is *L. italica.* Like its parents this is a free-growing, floriferous vine. Often the terminal part of a flowering shoot branches and forms a panicled thyrse of flowers a foot long and eight inches through. Related to these and also somewhat tender is the well-named *L. splendida* which hails from Spain. This has similarly long tubular flowers but red-purple without, yellowish within and very glandular.

Beautiful and hardy is the native evergreen *L. sempervirens,* found wild as far north as Connecticut, with clustered, unscented blossoms, orange-scarlet outside and yellowish within. The leaves are a rich green and the color combination of its honey-laden flowers is exquisite. It has given much of its beauty to hybrid progeny, one of which *L. Heckrottii* is very hardy. From the middle of June until the early frosts appear this plant is in blossom. The

clustered flowers are deep rose-color without and pale yellow within and although fragrant in the evening only they are very beautiful. Very vigorous growers are *L. flava* and *L. glaucescens,* with yellow flowers; *L. prolifera* (better known as *L. Sullivantii*) with yellowish flowers. *L. hirsuta* has hairy leaves and flowers with a yellow tube and orange-red lip; and the hybrid *L. Brownii* and its form *fuchsiodes* have wine-colored flowers. The European Honeysuckles or Woodbines *(L. Periclymenum)* of which there are several varieties one of which var. *belgica,* known as the Dutch Honeysuckle, is continuous blooming, and *L. Caprifolium* are or ought to be well-known favorites. Hall's semi-evergreen Honeysuckle *(L. japonica* var. *Halliana)* with white changing to yellow, fragrant flowers needs no comment and even more beautiful is var. *chinensis* with red-colored young shoots and leaves. The Chinese name for this plant is Chin-yin-hwa (Gold and Silver Flower) and is singularly appropriate. Many of these Honeysuckles are very subject to the attacks of a black aphids and can be kept in good condition only by careful spraying with an antidote early in the season as the leaves unfold. Another Chinese species is *L. Henryi* whose value to gardens lies in the fact that it is both hardy and evergreen in New England. The

reddish hued flowers and black fruits are not particularly striking but as a tangle for covering banks, or as a screen over walls and fences this is a most useful evergreen vine.

For northern gardens there are no more beautiful shrubs than some of the bush Honeysuckles with their myriads of yellow, white, red and rose-colored flowers, which in summer and early autumn are followed by shining scarlet, crimson or orange-colored fruits in their abundance weighing down the branches. When planted in good soil and given plenty of room many of these shrubs show their greatest beauty in the colder parts of this country. An old favorite is *L. tatarica,* the Tatarian Honeysuckle, which with its various forms and hybrids supplies gardens with many handsome flowering and fruiting shrubs. Being a native of central Asia where a rigorous climate prevails, it is a very hardy plant and flourishes even in the colder parts of Canada. A shrub of good habit with ascending and spreading branches, it will grow twelve feet high and fifteen feet through if given a proper position. Of the many forms that with white flowers *(alba)* and another *(rubra)* with rosy red flowers are the best.

Handsome is the well-known *L. Morrowii* which

our gardens owe to the early activities in Japan of the Arnold Arboretum. This wide-spreading shrub is seldom ten feet high but is often twice as broad, flat and intricate branched, with gray-green foliage and a profusion of white changing to yellow flowers and scarlet berries. The fruits ripen in July and remain brilliant on the branches until early winter. Taller in habit but less broad are *L. chrysantha* and *L. Ruprechtiana,* both with yellow flowers and lustrous crimson fruits. In gardens these four species and the Eurasian *L. xylosteum,* with wine-colored fruits, have hybridized freely and have produced several plants of extreme garden value. Two of the best are *L. muscaviensis* and *L. bella* both vigorous shrubs twelve feet high and more through with arching spreading branches weighted in July with a myriad clustered crimson fruits. Another is *L. muendeniensis* with more upright and spreading branches and scarlet fruits. And whilst telling of hybrids one must mention *L. minutiflora* with translucent pale orange-colored fruits, one of the most lovely of all bush Honeysuckles.

The sturdy *L. Maackii* with large milk-white flowers clustering the rigid branches from base to tip is the handsomest of its class. The type hails from northeastern Asia and its fruit ripens as its leaves

fall in October. A variety from China *(podocarpa)* which it was my good fortune to add to our gardens, holds its green leaves into December and is the last to ripen its fruit. When nearly every other shrub is bare this newcomer stands out with its mantle of green studded with red berries strong and defiant. As this Chinese shrub closes the Honeysuckle season with a flourish so its countrymen *L. Standishii* and *L. fragrantissima* open it. Scarcely has spring dawned when these push forth their white scented blossoms from buds densely clustered on bare twigs and ere midsummer their red fruits are ripe.

A shower bouquet of gray and pink describes the charming Turkestan Honeysuckle *(L. Korolkowii)*. This is from six to eight feet high and more through. loose-spreading and arching, of singularly graceful habit with bright pink flowers in great abundance. The foliage is pale gray and the fruit red. Planted against a dark background this gray-hued mist-like plant is fascinating. Very lovely too are its hybrids *L. amoena* and *L. arnoldiana* of smaller stature and more upright habit. All three, despite their delicate habit of growth, are perfectly hardy shrubs in New England.

With blue-black fruits more like a blueberry than a Honeysuckle is *L. coerulea* which, in its various

forms, is found wild throughout the boreal regions of the northern hemisphere. This is a shrub of rounded habit, suckering freely and forming a tangled mass, its stems clothed with loose scaling, pale brown bark. The flowers are relatively large, cream-colored, in pairs suggesting twin vases and are followed by more or less oval fruits. Being a circumpolar plant it flowers early and matures its fruit in great haste, the bushes being laden with ripe berries in June ere the Roses are in bloom. This fruit, luscious and attractive in appearance, is edible but not very palatable.

Distinct and curious are *L. involucrata* and *L. Ledebouri*, two bush Honeysuckles native of western North America. These are hardy shrubs of erect habit growing from five to eight feet high and broad and bear jet-black fruits seated on large rather fleshy red-colored bracts. The flowers are tubular, about one and one-half inches long, yellow in the first named, orange-tinged with red in Ledebour's variety and are produced in pairs from the leaf axils. The reddish cushion develops as the fruit ripens and the shining black berries are in striking contrast. They are summer fruiting shrubs and often flowers and ripe fruits are to be found on the plant in July.

In August, 1914, of sad and bitter memories, I

TURKESTAN HONEYSUCKLE. LONICERA KOROLKOWII

happened to be in southeast Saghalien and there on the coast of the Okhotsk Sea chanced upon a low shrub each twig clad with bluish green leaves and crowned with a cluster of coral-pink fruit. The plants were scarcely two feet tall but more in width, of compact habit and I lost no time in harvesting a supply of seeds. It proved to be *L. Chamissoi,* a Honeysuckle then unknown in cultivation. In the Arnold Arboretum seedlings have grown into nice plants and in 1924 for the first time began to fruit freely. Among the multi-colored fruits of the large genus Lonicera no other kind has coral-pink berries.

Without attempting to tell of more than a tithe of the good garden plants among Honeysuckles I may mention another newcomer of excellence, this time from Korea. In 1917, on the Diamond Mountains, I gathered some red fruits from a shrub four or five feet high with erect branches. The seeds vegetated freely in the Arnold Arboretum and we now have shapely plants a yard high. In 1923, they flowered sparingly and were identified as *L. Maximowiczii* var. *sachalinensis,* a terrible name for a beautiful shrub! Last year the plants were densely laden with crimson flowers on long slender pendent stalks. The leaves as they unfold are bright red, which adds to the attractiveness of this pleasing plant.

Very pleasing gray shrubs are the twiggy wide-spreading *L. syringantha* and *L. thibetica* with axillary clustered heliotrope-scented flowers. These are both hardy, intricate branching shrubs from five to eight feet tall or sometimes nearly prostrate in habit and bright red fruits. They produce flowers from midsummer until late fall but never make a great display. Moreover, the flowers are much hidden but their fragrance in the cool of morning and evening is delightful. They are much alike but the Thibetan plant is the smaller and has leaves shining green above with a dense white felt on the undersurface.

Most of the bush Honeysuckles lose their leaves in the fall but there are a few species that are evergreen. The most useful of these is the Box Honeysuckle *(L. nitida)* which I discovered and christened. For climates milder than that of New England this shrub has much to recommend it. In California it has already become valuable as a hedge plant and for this same purpose it should do good service in gardens south of Washington, D. C. It propagates readily by cuttings, grows rapidly and relishes trimming as heartily as does Box. It is a shrub growing four to six feet tall with ascending main branches and a plethora of slender, rigid, horizontally-spreading branchlets crowded with small roundish shining dark green

leaves and cream-colored, fragrant flowers followed by blue-purple fruit. The neat habit and appearance makes this plant worthy as a specimen bush but its supreme value is for quickly forming low evergreen hedges. From the altitude where this species grows naturally in western China I had hoped it would have proved hardy in New England. In this I have been disappointed but its suitability as a hedge plant in milder climates is commensurate pleasure. A re-dated species is *L. pileata* with larger foliage and horizontally spreading branches but with similar flowers and fruit. This plant hugs the ground and is well suited for rockeries. Though not properly hardy with protection it has lived for a dozen years in the Arnold Arboretum.

As a final illustration of all the all-round usefulness of Honeysuckles in our gardens I may mention *L. prostrata*. This, as its name implies, is a trailing plant and it emits roots freely forming a dense mat or carpet. It has small yellow axillary flowers, orange-red fruit, deciduous foliage, is very hardy and is especially valuable for draping sloping banks.

DEUTZIAS

GARLANDS OF WHITE AND PINK

EUTZIAS are an elegant group of June-flowering shrubs,—deciduous, accommodating and abundantly floriferous. Common plants in the low thickets on mountain slopes and bordering streams throughout the temperate parts of the Far East, Deutzias are found from the Himalayas eastward through China to Korea and Japan. Two species are peculiar to Mexico but all the others are Oriental. In central and western China in late May and June they are prominent features of the countryside. Some are found in rocky places but the natural home of the majority is moist situations where good loam obtains. In all some fifty species have been recognized of which more than twenty are in cultivation. In addition, gardens enjoy a dozen good hybrids and many varieties. That great French hybridist, Lemoine, has given the genus much attention and to his skill and genius we owe many of the finest Deutzias of today. From western China in 1888, a French priest sent to his native land *Deutzia purpurascens,* which has flowers suffused with rose-purple on the outside.

Working with this and several of the white-flowered species Lemoine evolved a new group of Deutzias with blossoms varying from shades of rose-purple to almost pink.

Deutzia as known today is a modern group of shrubs. Turning to the pages of Nicholson's *Dictionary of Gardening*, issued in 1887, I was surprised to find four species only enumerated. Since that date there has been created dozens of fine hybrid varieties and the Far East has yielded many new species. All are shrubs with deciduous, scabrid leaves, upright and arching branches and average from three to six feet in height; a few of the more vigorous species make bushes from ten to twelve feet tall but these are exceptional. Most parts of the plant are furnished with stellate hairs or scurf which, most abundant on the leaves, give the majority of the species a rough harsh texture when the fingers are brushed over them. They are related to the Mockoranges (Philadelphus) from which they differ chiefly in their roughened leaves and smaller, five-partite flowers. With rare exception the flowers are borne in racemes or panicled clusters terminating short leafy branchlets which are freely produced from base to tip of the shoot. Every branch is transformed into a plume of blossoms and the whole bush is a floral fountain. White, of the

purest, dominates the group but at least two species in cultivation have rosy purple passing to almost pure pink blossoms. And as told above a whole race of garden hybrids have rose-tinted flowers. Deutzias bloom in late May and June. They are shrubs of good habit sending up from the rootstock slender shoots in abundance. Every other year the old exhausted stems should be cut clean away otherwise no pruning, other than the removal of dead wood, is required. The blossoms are from the shoots made the year previous, so no shortening back can be done in spring except at the sacrifice of flowers. They are easily propagated by cuttings of half-ripened wood inserted in a frame or under a cloche in July and early August. Rooted pieces may with ease be removed from any established plant, and all the species are readily raised from seeds.

In general Deutzias are happier in climates milder than that of Boston, Massachusetts, but in the Arnold Arboretum a good collection is maintained with little difficulty. Most winters, however, the ends of the shoots get killed and the natural form of the bush is impaired. A cool loam is the ideal soil and whilst they enjoy protection from winds they do not tolerate with impunity overhead shade. In gardens their greatest use is as specimens or clumps on the

HYBRID DEUTZIA LEMOINEI

edge of lawns where they should be given ample room to develop their proper shape. They are also well fitted for associating with herbaceous perennials in mixed borders; also they are very serviceable in foundation planting. The vigorous growing *D. scabra* and its varieties may be used to advantage in shrubberies and on the edge of woodlands. With rare exceptions the flowers are scentless and the value of these plants is in abundant blossom and graceful habit of growth. Not subject to disease nor insect-pests of any sort they are, where climate suits, among the most amenable of flowering shrubs. Grown in pots or tubs Deutzias are easily forced into bloom at any time from Christmas until Easter, indeed, no shrubs are more accommodating in this respect. The old favorite *D. gracilis* is widely used for this purpose and with its slender arching stems strung with racemes of snow-white blossoms it is a charming sight. More lovely still are the hybrids *D. rosea*, *D. carnea* and their many forms with more or less rose-pink flowers.

The earliest of all the Deutzias to bloom and the one with the largest flowers is fittingly called *D. grandiflora*. Native of northern China, this is a hardy shrub from four to six feet high with blossoms, each one and one-quarter inches across, borne

singly or in two to three-flowered clusters. Known since about 1743 it was not introduced into gardens until 1910, when William Purdom sent it to the Arnold Arboretum. Though quite hardy with us it is not free-flowering and remains quite rare in gardens.

The oldest Deutzia in cultivation is *D. scabra,* which was introduced in 1822. This is the tallest and most vigorous growing of all the hardy species, attaining a height of from ten to twelve feet with stout stems and shaggy exfoliating bark. The flowers, borne many together in upright panicles, are white or occasionally pinkish on the outside. There are many forms of this old favorite in gardens. One of the best known is var. *Watereri,* which has white flowers tinted carmine on the outside, each one inch across. Another, known as var. *Fortunei,* differs but little from the type. Several forms have double flowers, the best known being var. *plena,* better known as the "Pride of Rochester", with flowers suffused with rose-purple on the outside. Another good sort with pure white double flowers is var. *candidissima.* In any of its forms *D. scabra* is a handsome and reliable shrub. It is very hardy and produces its showy, erect flower panicles in great profusion. The strong branches in their second year are trans-

formed into two-foot long pyramidal masses of bloom.

Related to the above is *D. Schneideriana,* a newcomer which it was my privilege to introduce from China some twenty years ago. It is a vigorous growing, free-flowering shrub with broader and looser panicles of blossoms than *D. scabra.* The variety *laxiflora* is a better garden plant than the type. Another newcomer from China is *D. Vilmorinae,* which has gracefully spreading branches, large white flowers in loose broad corymbs. A hybrid between this and *D. scabra* has been named *D. magnifica.* It was raised by Lemoine and has white blossoms in dense clusters. There is also a double-flowered form known as var. *formosa.*

Perhaps the most popular of Deutzias is the Japanese *D. gracilis,* introduced so long ago as 1840 and abundantly used for forcing. This is a slender stemmed shrub, often six feet tall, with arching branches densely clad in season with upright panicles or racemes of pure white flowers. When in blossom it is a fountain of white.

A very hardy species is *D. parviflora,* native of north China and known in gardens since 1862. It is a shrub of upright habit, growing six feet tall with flattened heads of white flowers, each one-half inch

across. Crossed with *D. gracilis* it has given us *D. Lemoinei,* one of the most popular and beautiful of all the Deutzias. This was raised in 1891 and is now very widely grown. There are varieties *compacta* and Boule de neige, both first-class shrubs. Closely related to *D. parviflora* is *D. glabrata,* a common plant on the mountains of Korea from whence I introduced it into the Arnold Arboretum in 1917. This is an erect growing Deutzia, some five to six feet tall, not so dense in habit as many others and, as its name suggests, smooth in character.

A common species in central and western China is *D. discolor* with arching stems, relatively long, thinnish leaves and broad clusters of white, occasionally tinted pink, blossoms. A variety named *major* has an inch-broad flower. It was my good fortune to introduce this with half a dozen other species to gardens early in the Twentieth Century. One of these, *D. Wilsonii,* is a white-flowered shrub of vigorous growth, characterized by its large leaves; another *D. glomeruliflora* is remarkable for its densely clustered masses of white flowers and rather small leaves. Both are fairly hardy in the Arnold Arboretum. Yet another is *D. mollis,* easily distinguished by the soft hairs clothing the under surface of the leaves. A fourth is *D. hypoleuca,* distinct among

cultivated species in having leaves smooth and almost white on the under surface. Upright in habit this has prim-looking semi-globose clusters of pure white blossoms.

A rather low-growing Deutzia quite common in Japan is *D. Sieboldiana* with leaves wrinkled on the upper surface and loose upright panicles of flowers. Introduced in 1875 this species has been confused with the more showy *D. scabra.*

On the mountains of southwestern China Abbé Delavay discovered a Deutzia *(D. purpurascens)* with star-shaped flowers, white suffused with rosy purple on the outside. He sent seeds to Monsieur M. de Vilmorin in 1888, and some of the resultant plants passed to Lemoine of Nancy. Apart from pink-tinted forms of *D. scabra,* all the Deutzias known at that date had white flowers and Hybridist Lemoine proceeded quickly to make good use of his newly acquired treasure. He crossed it with all the species he could obtain and the results were remarkable. The hybrids secured gave to gardens a new race of Deutzias and completely altered our conception of the genus. Crossed with *D. Sieboldiana,* Delavay's find yielded *D. elegantissima,* with flowers suffused with rose-color, its very similar form, *fasciculata,* and the white-flowered *arctuata.* More beautiful are the hy-

brids with *D. gracilis* to which the name *D. rosea* has been given. The type of the race has open bell-shaped flowers, pinkish without and each nearly an inch across. Of the many forms of *D. rosea* I may mention *carminea* with flowers rosy purple on the outside, *eximea, floribunda* and *grandiflora* with pinkish flowers. The forms *campanulata, venusta* and *multiflora* have white flowers in rich abundance. The hybrid *D. rosea* crossed with *D. Vilmorinae* produced the upright panicled *D. carnea,* which has flowers pink without. Another race *(D. maliflora)* with flowers rosy purple outside resulted from crossing *D. purpurascens* with the hybrid *D. Lemoinei.* The raiser gave the name Fleur de pommier to this cross and called one colored form Boule rose and a white one Avalanche, all very descriptive titles. The handsomest of all the *D. purpurascens* hybrids, however, is *D. kalmiaeflora* obtained by mating with *D. parviflora.* This is a graceful habited shrub with a multitude of flowers, pale rose-color on the inside, deeper without. All the hybrids of *D. purpurascens* are remarkable for their abundant star-like blossoms, which are exceedingly pleasing both in the opening bud and expanded flower. On the whole they are hardier than their parent species, and all garden lovers owe a debt of gratitude to the illustrious Frenchman

LARGE-FLOWERED DEUTZIA DISCOLOR MAJOR

for these, not least of his manifold gifts to gardens.

In 1903, when travelling in western China, I fell in love with a Deutzia with inch-broad flowers, varying in color from bright rosy purple to almost crimson-pink. There was great variation in color and on some plants the blossoms were almost pure pink. It was quite a common shrub in the wayside thickets, growing from four to six feet tall with ascending-spreading and arching stems richly dowered with flattened three-inch broad flower clusters. I marked carefully some of the finest colored forms and in autumn harvested seeds. Deutzias fruit abundantly and their seeds, which are minute, germinate freely and quickly. In due season plants raised from the collected seeds blossomed and the species proved to be *D. longifolia,* previously known from specimens collected and dried by Pére David but not before introduced into cultivation. The best colored and largest flowered form was named var. *Veitchii* and acclaimed the most beautiful of all Deutzias. In 1908, I was fortunate enough to discover and introduce another fine variety. This has been baptized var. *elegans,* being distinguished by its bright rosy purple flowers, freely borne in rather loose corymbs along slender arching branches. The fly in the ointment is that in the Arnold Arboretum the

climate is too severe for *D. longifolia* and its varieties to do themselves full justice. When one considers that the hybridist has evolved from the less hardy and much less beautiful *D. purpurascens* it requires no gift of prophecy to predict a great future for *D. longifolia* as parent of races of Deutzia with bright and pleasingly colored flowers.

SPIRAEAS

FOUNTAINS OF BLOSSOMS FROM MAY TO SEPTEMBER

AST June I spent several delightful days in and around Lake Forest, Illinois, where I was well pleased with the local spirit of gardening. A harsh climate obtains but the people are battling it successfully and with great credit. Many fine gardens and estates abut on the shores of Lake Michigan, the owners of which were clamoring for greater variety among shrub and tree. At the time Vanhoutte's Spiraea was in full bloom, and lovely were its arching billowy masses of pure white. There were hedges of it by the roadside, conspicuous clumps of it everywhere and specimens, either singly or in groups, featured every garden. Where its cultivation was properly understood it was undeniably beautiful. All too frequently, however, pruning had been neglected and much dead wood and a general weediness of appearance were in evidence. That it was vastly overplanted no one denied, and quite soon its wreathed masses began to pall and one's eye ached for variety.

Lake Forest is not the only place where the popular shrub has been over-indulged. One need go no

farther than the environs of Boston, Massachusetts, where I live, to see a superfluity, and this is true of the suburbs of every town and city in New England and New York state, to go farther afield. Like some other accommodating, good-natured and withal beautiful shrubs, Vanhoutte's Spiraea suffers from over-popularity. Like certain pieces of music it has been grossly abused and frayed into jazz. This abuse cheapens gardens and destroys that greatest of assets, the charm of individuality. Our gardens should express our own tastes and not those of the mob. Let me hasten to say that I have naught against this Spiraea. On the contrary, I subscribe to its being one of the finest of its class, a fit and worthy member of a handsome group of hardy shrubs. It is only against its slavish planting by the million that I do strongly protest.

The Spiraea tribe is a large and useful one and by judicious selection its members may be used to beautify gardens from spring until September. White flowers dominate the genus but there is a group of summer-flowering sorts, typified by *S. japonica* and *S. Douglasii*, that has pink blossoms of varying shades. Spiraeas are all shrubs with simple undivided leaves, and they vary in height from less than three feet up to about ten feet, according to species.

They are of bushy, twiggy growth and unless the knife is freely used are soon overgrown and untidy, even weedy, in appearance, and lose both in quality and quantity of flower clusters. The spring and early summer-flowering sorts all have white blossoms in umbellate or corymbose clusters freely produced along the shoots of the past season's growth. The midsummer and August blooming kinds have terminal and lateral flattened or panicled clusters of flowers on the current season's shoots. And so in pruning two distinct groups must be recognized and treated differently. The spring and early summer bloomers should be pruned immediately after the flowering period. Cut clear away all the very old wood, shorten the healthy shoots and shape the bushes, thin out and encourage strong basal growth. Those blossoming on the current season's growth should be pruned hard, even to the ground, in the early spring.

Spiraeas are sun-loving shrubs demanding full exposure and give best returns in a good cool loam. They are, however, very good-natured and thrive well in quite ordinary soil, even that of a gravelly nature. But like other flowering shrubs they respond to generous treatment. Many are easily increased by taking sucker-growths from the base or by

division of the clumps. Others may be propagated by means of cuttings of half-ripe wood in July and August or by hardwood cuttings in the winter. Seeds germinate freely but the plants tend to hybridize and are not to be trusted to breed true to type.

Their best use is for planting in groups at vantage points where their wealth of white blossom is shown to great effect. Some of the larger sorts, like *S. Henryi* and *S. Veitchii,* are best as individual specimens on the edge of lawn and shrubbery. They may also be used for hedges, and those with arching branches are splendid topping low walls. The dwarfer kinds like the *japonica* group may be well employed as groundcovers by the roadside and as clumps in the herbaceous border. The point always to be remembered is that sun and full exposure to the winds are essential for their well-doing.

Among the first Spiraeas to flower is the Japanese *S. Thunbergii* in late April and May. A slender twiggy shrub growing about a yard high, it has spreading branches strung with sessile umbels of white flowers. During the summer it is a cheery mass of bright green feathery foliage which late in the autumn turns orange and scarlet. Another twiggy-stemmed but taller species with orange-tinted autumn foliage is *S. prunifolia.* The form *(plena)*

HANDSOME SPIRAEA VEITCHII

most usually grown has double flowers and is one of the handsomest of early flowering shrubs well deserving of the name Bridaltresses or Bridalwreath which it enjoys.

The most free-flowering and conspicuous of the early Spiraeas is *S. arguta,* a hybrid of which *S. Thunbergii* is part parent. This is a dense bush some six feet tall and broad with flower clusters crowded toward the end of the shoots forming snowy sprays a foot long. It is very hardy, remarkably floriferous and thoroughly dependable. Less hardy and remarkable for its large and fragrant flowers is *S. cantoniensis* of which the double-flowered form *(lanceata)* is most common in gardens. These are plants of wide-spreading, graceful habit producing a dense clustered mass of stems, the outer ones of which are arching, clothed with lozenge-shaped dark green leaves which in mild climates are retained until spring. Beautiful as this Spiraea is in the popular mind its lasting fame rests on being part parent of the redundantly planted *S. Vanhouttei* whose merits and abuse have been expatiated upon. The other parent is *S. trilobata,* a much dwarfer plant with erect spreading branches and three-lobed leaves, found wild over an immense region from Turkestan to north China.

The Orient, which has contributed so largely to our garden needs, is really the headquarters of the Spiraea tribe and since the dawn of the present century has given us several unusually handsome species. During travels there it was my good fortune to introduce some ten species of which *S. Henryi, S. trichocarpa, S. Sargentiana,* and *S. Veitchii* are rated highly by shrub lovers. The first-named opens its broad clusters of flowers in the first half of June and at that time is easily first of its class. A shrub of relatively loose, wide-spreading habit, it grows fully ten feet high and more than this in diameter, and when wreathed in blossom is a beautiful sight. It is a native of the mountains of central China and has proved perfectly happy in the Arnold Arboretum. From the same region comes *S. Wilsonii* which is not so good a garden shrub.

The Diamond Mountains in Korea yielded *S. trichocarpa* in 1917. This is a bush of compact, rounded habit, the outer branches gracefully arching, growing about six feet tall and ten feet through. The flowers are borne in rounded or dome-shaped three to five-inch broad corymbose clusters at the ends of short lateral leafy shoots. The clusters are abundantly produced and transform the shoots into

arching sprays of blossom. It is one of the best shrubs Korea has contributed to American gardens.

The best of the June-flowering Spiraeas that Japan has given us is *S. nipponica,* more commonly known as *S. bracteata.* A vigorous shrub, growing fully eight feet high, this has ascending-spreading branches and forms a more or less vase-shaped bush. It has rather small, rounded or conical, dense-flowered clusters of prim-looking flowers. Like all its clan it is very floriferous, but in my opinion inferior to its Korean sister *S. trichocarpa* which blossoms a little later.

A very elegant Spiraea of balloon-like habit is *S. Sargentiana* which worthily commemorates a great figure in American horticulture, alas! no longer with us. It is of intricate twiggy habit with the stouter branches gracefully bowed. I well remember the hot and trying June day in 1908 on which I discovered it. Escaping early from vermin-infested lodgings, we had tramped for some ten hours down a valley as torrid as Hades and walled in by cliffs radiating stifling heat. Up and down we wearily dragged ourselves and below rushed the foaming waters of the turbulent Min River. Not a tree to give shade from the scorching sun nor a decent house or inn to rest within. Low shrubs, many with spiny branches,

eked out a miserable existence but withal put forth pleasing blossoms in quantity. Five years before I had discovered the Regal Lily in this arid valley and my mission at the moment was to rescue this fair princess and arrange for her transport to a land where her beauty would receive due recognition. En avant! En avant! was our cry when a low, tangled, twiggy mass arrested my attention and *Spiraea Sargentiana* was discovered. The following November I retraced my steps and harvested the seeds. Need readers wonder that a bush of this Spiraea in the Arnold Arboretum is to me rich in memories? Nor may they wonder why it is named for a man whose memory I revere.

In late June, 1900, at some 10,000 feet elevation above sea-level in the heart of China, I discovered a Spiraea and declared it to be the finest of late-flowering sorts. It proved to be new and was later named *S. Veitchii* at my request. Twenty-eight years have passed and my spontaneous opinion is abundantly corroborated by that of specialists in Europe and America. It is the tallest of all the true Spiraeas, attaining a height of fifteen feet. Less broad than tall, it makes the usual gracefully-habited bush with fathom-long stems toward the end of June wreathed in broad clustered blossoms. Its vigor and

excessive floriferousness called forth the encomium since attested by experts, and perfect hardiness in the Arnold Arboretum is an added virtue of no little value. With little effort I came by *S. Henryi,* but *S. Veitchii, S. Sargentiana* and *S. trichocarpa* cost me much in physical effort and endurance. Calmly and deliberately I declare them worthy of what I gave and more, and here invite the opinion of all who will visit and view them in the Arnold Arboretum.

Typical of a group with pink to carmine flowers which blossom in late June, July and early August is *Spiraea japonica.* Authorities differ widely as to the standing of the members; some regard them as varieties of one species, others as distinct species and others as hybrids. But we are more concerned with their garden value and of this there is unanimous applause. The type, as its name indicates, is native of Japan and is a shrub of open habit with erect stems, topped by broad flattened clusters of crimson-pink blossoms. It grows from three feet to five feet high and is an all-round first-class shrub of great hardiness. Like all its group it should be pruned in spring by cutting completely away sufficient of the older wood to prevent crowding and shortening back those shoots selected to remain. A form known as *ruberrima* has deep pink blossoms. The variety *alba,* or as

others call it species *(S. albiflora)*, is of lower growth and has white flowers. A hybrid between these two is *S. bumalda* which is usually not more than eighteen inches tall and has broad clusters of carmine blossoms. A form known as Anthony Waterer has the most highly colored flowers of any Spiraea. Another hybrid is *S. Margaritae* which produces an abundant crop of bright rosy pink flowers in July and lesser quantities in late August and September.

Another group found wide-spread in the boreal regions of both hemispheres and exemplified by our common Hardhack or Steeplebush *(S. tomentosa)* has erect terminal spike-like clusters of pink and white flowers. Abundant in open wet meadows and bogs, *S. tomentosa* is in districts of the lower St. Lawrence Valley a prominent feature in the August landscape. Its place, however, is more in the wild garden than the precincts of the house. The best of this group are *S. Menziesii* and *S. Douglasii,* natives of northwestern North America, growing about six feet tall, each stem terminating in long panicled clusters of rosy pink flowers. An Old World representative is *S. salicifolia* with strictly upright stems terminating in panicles of white or rarely pink blossoms.

At midseason most of the Spiraeas are past blooming but their place is well taken by the closely allied

CASCADING SORBARIA ARBOREA

genus Sorbaria, distinguished by pinnate leaves and terminal compound panicles of flowers. Five species are hardy in the Arnold Arboretum. They thrive in ordinary soil but the best results are obtained by planting them in rich loam in a moist place. By the side of a pond or stream their grace and beauty are seen to best advantage. They are excellent subjects for the wild garden and to develop their full beauty they must have plenty of room.

The finest of the Sorbarias is *S. arborea,* a very common shrub in central and western China whence I introduced it into the Arnold Arboretum and elsewhere. On the Chino-Thibetan borderland in particular this plant is very abundant, growing from fifteen to twenty feet high and as much through, and bearing in profusion much-branched arching panicles, each often two feet long, of white flowers.

From the extreme northwestern Himalayas came *S. Aitchisonii* with smooth shoots and pale green leaves and large masses of flowers like the preceding, which it resembles in size and habit. In Hokkaido and Saghalien the well-known *S. sorbifolia* is a shrub from three feet to five feet tall with erect shoots terminating in rigidly upright, wide-branched panicles eighteen inches high. I retain a vivid recollection of the picture this shrub presented during August in

Saghalien. There, on the margins of grassy swamps and swampy woodlands and by the side of streams and ponds, this plant luxuriates in great abundance; its pyramids of white flowers with their prominent stamens, reared on rigid stems and subtended by numerous large deep green leaves, presented a never-to-be-forgotten spectacle.

The other two species *(S. assurgens* from western China and *S. stellipila* from northern Japan) are also well worth growing. A sixth species *(S. Lindleyana)* from the Himalayas is not hardy in New England.

VIBURNUMS

ABUNDANT OF FLOWER AND FRUIT

FOR ALL-round excellence Viburnums are entitled to high rank among hardy plants suitable for the embellishment of parks and gardens. Most of them are shrubs, a few are small trees, all are good in habit and handsome in foliage, flower and fruit. Some are evergreen, but the majority shed their leaves in autumn. They have white flowers, tinged with pink in a few species, and many are fragrant. All have berried fruits which may be red, black or blue and in several as the fruits ripen the changes in color are most pleasing. As a group Viburnums are characterized by their opposite, simple leaves, five-partite flowers borne many together in flattened, rounded clusters or sometimes in pyramidate panicles, always at the ends of the shoots. In several species, for example the Guelder Rose *(V. Opulus)*, the inflorescence has an outer ring of large flowers which are perfectly sterile and strikingly distinct from the other flowers of the cluster. Under cultivation a few sorts have sported an entire cluster of these large neuter flowers and produced the familiar Snowball-bush.

This same phenomenon appears in certain Hydrangeas but is otherwise unknown among hardy woody plants.

Many Viburnums are woodland plants which grow naturally in moist situations rich in rotting leaves; all enjoy a cool and deep loamy soil. With few exceptions they are of easy cultivation, and are readily increased from seeds or cuttings or by layering. Some like the Arrow-wood *(V. acerifolium)* are good border shrubs forming a low thicket of growth in full exposure or under trees. But most of them to display their full beauty require plenty of room. They need little attention in the matter of pruning, so important among shrubs in general. The season of flowering is from March to July; the fruits ripen in September and remain objects of great beauty until Christmas. Much of its summer beauty the Arnold Arboretum owes to the free-planting of Viburnums, a practice worthy of emulation in every large garden. They really give magnificent returns being beautiful for fully eight months of the year and in general are not prone to disease or insect pests. The European Snowball-bush, the Viburnum formerly most extensively planted, is the marked exception being very subject to attacks of black aphis which ruin both foliage and flowers unless controlled

by spraying. Perhaps this is a punishment meted out for its sterility. At any rate it has brought the plant into general disfavor in gardens, but this should not be held against an entire family, especially one so rich in valuable qualities as Viburnum.

The headquarters of the genus is the Orient but eastern North America boasts many species all of which are good garden plants worthy of being much better known. A few species only are native of Europe and the Caucasus region. In all more than one hundred distinct Viburnums are known and half of them are in cultivation.

American Viburnums have been known in gardens since early in the Eighteenth Century for we are told that *V. prunifolium* was introduced into England in 1731 where they do not appear to have ever occupied the prominent position to which they are entitled. It is possible that the climate is not specially to their liking but more probably it is indifference or the nurserymen's bad habit of grafting them on unsuitable stocks. If raised from seeds, cuttings or layers and given a fair trial I think they would be found amenable there. In the Arnold Arboretum Viburnums are very extensively planted and visitors from Europe are always attracted by their beauty. In flower some of the Asiatic species may excel but

in fruit such Americans as *V. cassinoides, V. prunifolium* and *V. Lentago* are unrivalled.

The earliest American Viburnum to open its blossoms in the spring is *V. alnifolium,* the Hobble-bush, a very beautiful plant with flower clusters ringed by large pure white sterile blossoms. Though common in the moist woods of New England and elsewhere this plant is one of the most difficult to succeed with in gardens. Another native species, *V. cassinoides,* which grows naturally in swampy places, flourishes under cultivation in any sort of situation. A shrub from five to ten feet tall, of compact habit, this plant has rather thick, dull green leaves and short-stalked, broad convex clusters of cream-colored flowers. Good as it is in foliage and blossom it is loveliest in fruit. This when fully grown is yellow-green, later it becomes pink and finally blue-black. Often all three colors may be seen in the same cluster and the combination is singularly beautiful. A closely related southern and somewhat less hardy species is *V. nudum,* distinguished by its shining green leaves and long-stalked inflorescence.

The American species of the Opulus group *(V. americanum),* known as the Cranberry-bush, is a plant of loose habit with translucent scarlet fruits which hang on the branches far into the winter; the

leaves turn in the autumn to brilliant shades of orange and crimson. It is rather curious that this and *V. pauciflorum,* which is difficult to grow, are the only red-fruited Viburnums known from America.

For the decoration of large gardens and parks there are no small trees better suited than three arborescent Viburnums native of the eastern United States. The first of these to open its flowers is *V. prunifolium,* the Black Haw, which is sometimes thirty feet tall, of rigid, twiggy habit with pure white flowers in flattened clusters; the fruit changes from shades of pink as it ripens to dark blue at maturity when it is covered with a glaucous bloom. The second species is *V. Lentago,* the Nanny-berry, which is much-branched, round-topped and often from twenty to thirty feet tall. The leaves are shining green, the flowers cream-colored, produced in broad clusters and the fruits, which are nearly black or dark blue, are sweet and juicy. The third species is *V. rufidulum* easily distinguished by the dark brown velvety hairs, which clothe the buds in winter. In rich soil on its native heath in the southern States this is a tree sometimes forty feet tall but in Massachusetts, where it has proved perfectly hardy, it is more of a bush than a tree. Like its relative, the Nanny-berry, it has shining leaves but the flowers

are pure white and the fruit bright blue and clothed with a glaucous bloom. The Nanny-berry is well suited for planting as a screen but the other two should be given room to develop their individuality.

Two rare American Viburnums are *V. molle,* native of the southeastern States, and *V. bracteatum,* known only from one locality in Georgia. Both are broad shrubs of good habit growing from five to eight feet tall with flattened clusters of white flowers. *V. molle* has thin, loose scaling bark which is attractive in the winter season.

A very pleasing species is *V. affine* of dense compact habit, with clustered pure white flowers and shining black fruits. Other summer-blooming American species are *V. dentatum* and *V. pubescens* and, last of all to open its blossoms, *V. Canbyi.* These are all much alike in general appearance being dense in habit and well-suited for grouping or as screens to hide unsightly objects. They grow from ten to fifteen feet tall and have dark green leaves, white clustered flowers and small blue-black fruits. They sucker freely from the base and form in time quite impenetrable masses.

The autumn tints of many American Viburnums are very fine and none more so than those of *V. acerifolium,* so common an undergrowth in the open

ARROWWOOD, VIBURNUM DENTATUM

woods and by the roadsides of New England. The leaves commence to turn early in the autumn and vary in tints from pale to intense crimson-purple, sometimes they appear lightly stained with wine-red. The foliage of *V. pubescens* also assumes rich red-purple tones, whilst that of *V. dentatum* and *V. Canbyi* is often a deep blackish purple.

For the small garden where there is room only for the choicest shrubs the one Viburnum, above all others, that should be grown is *V. Carlesii*. This is a real aristocrat, perfectly hardy in the coldest parts of New England with flowers redolent in sweet fragrance. The habit is flattened-round, forming an open bush usually from four to five feet tall and more through. The flower clusters are globose and dense and are formed in the autumn and the blossoms open ere spring is a fortnight old. Rich pink in the bud the flowers are pure white when fully open. They are waxy in texture and their clove-like fragrance penetrates the air for more than a hundred yards around. From Korea, Land of the Morning Calm, came this delightful shrub about twenty years ago. Its beauty conquered on first acquaintance and the demand for it was eager. Nurserymen to cope with the demand found ready means of propagation by grafting it on the Wayfaring-tree *(V. Lantana)* but

the result has been disastrous to the customer. For a few years only is it happy on this stock, then it ceases to thrive, lingers awhile and then dies. On its own roots it is a long-lived shrub and garden lovers should demand plants raised from cuttings.

Carles' jewel is a purely Korean plant but there is a Viburnum native of western Japan which is so very similar that Japanese botanists identified them as one and the same. In perfect good faith the Japanese plant was placed on the market by a prominent nursery firm in Yokohoma. Garden-lovers, however, were quick to detect points which the botanist overlooked and voiced their opinions and disappointments. The Japanese species is now known as *V. bitchiuense* and although admittedly inferior to the *V. Carlesii* is really a pleasing plant. It is much more open in habit, indeed is inclined to be straggling, the flower clusters are convex, looser and broader, but the blossoms, though possessed of distinct morphological characters, are similar in color and fragrance. It just misses being first-class but many worse shrubs are favored in our gardens. A related species from north China named *V. fragrans* is beginning to make itself known and some declare it destined to wrest the sceptre from the Korean Viburnum. This Chinese plant has dark green, promi-

nently veined leaves and paniculate clusters of pinkish blossoms, very fragrant and opening earlier than those of *V. Carlesii*. In Peking and elsewhere in China this Viburnum is a great favorite and is forced for indoor decoration. Without questioning the merits of this debutante the crux, so far as those who garden in New England is concerned, is its hardiness. To date in the Arnold Arboretum's experience it has proved tender, killing back each season possibly it may in time become properly acclimated.

Not far removed from *V. fragrans* is *V. erubescens*, a common Viburnum on the mountains of central and western China and extended west along the Himalayas where it was first discovered. It is a variable plant sometimes fifteen feet tall with oblong to oblong-obovate leaves, pinkish very fragrant flowers in pyramidal much-branched either spreading or hanging panicles. It has not proved hardy in the Arnold Arboretum and we have lost it though it must be growing in other gardens since I sent back plenty of seed which was freely distributed.

In Europe only three species of Viburnum are native but two of these the Laurustinus *(V. Tinus)* and the Guelder Rose *(V. Opulus)* rank with the finest of the genus. The Wayfaring-tree *(V. Lantana)* is also entitled to a prominent place being a

robust shrub sometimes fifteen feet high with cream-colored, agreeably scented flowers and oval fruits, red changing to black when fully ripe. On the Himalayas grows *V. cotonifolium* and in China *V. Veitchii,* both closely related to the Wayfaring-tree but less hardy and not so good as garden plants. To the same group belong the Oriental *V. mongolicum, V. burejaeticum* and *V. shensianum* but they have little to recommend them save rarity. Another Chinese species *(V. buddleifolium)* with light green, oblong-lance-shaped leaves, soft in texture, broad clusters of white flowers and red changing to black fruit, is however, quite a good shrub. It grows from five to eight feet high and retains its leaves in good condition through the winter, if planted where it is sheltered from strong winds.

The species which form the Opulus section of the genus make a very distinct and beautiful group of Viburnums. These have bright-green Maple-like leaves, flat heads of blossoms ringed by large white sterile flowers and luscious red fruits in hanging clusters. Those interested in the development of new fruits ought to take these Opulus species in hand. The wilding's fruits make a good preserve and domestication would in all probability bring about results well-worth while. On the whole the hand-

somest member of this group is *V. Opulus,* the Guelder Rose of Europe. The flower clusters are smaller perhaps than those of its immediate relatives but the plant grows to a larger size, is more compact in habit, the leaves remain on the branches much later in the season and the fruit is as large and deeper in color. The Snowball-bush of old-fashioned gardens is a form *(sterile)* of this plant in which all the flowers are neuter. There is also a form with lustrous yellow fruit *(xanthocarpum)* and a very dwarf form *(nanum).* A second species is *V. Sargentii,* which hails from the Orient and has larger sterile flowers than others but smaller fruits, dull in color. A third species is *V. kansuense,* a shrub rarely six feet tall with slender stems and pinkish blossoms which I introduced from western China. It is a pleasing plant but with us, for some unknown reason, it refuses to grow except in millimetres each year and I despair of seeing a good specimen growing in the Arboretum. The two American species *(V. americanum* and *V. pauciflorum)* have already been mentioned.

Perhaps the most popular Viburnum in western gardens today is the Oriental *V. tomentosum,* a very lovely plant. This is a large shrub with tiers of wide-spreading horizontal branches on the upper

side of which the flat flower-clusters are thickly placed, each cluster surrounded by a ring of snow-white ray flowers. The leaves are dark green with deeply impressed prominent veins and are a splendid foil to the blossoms. There are several varieties of this plant including an excellent Snowball form which is sold under the name of *V. plicatum.* Largest of all the Snowballs is the Chinese *V. macrocephalum* with a ball of flowers almost as large as a child's head—too large in fact weighing down the branches. The plant itself is short-lived though quite hardy in New England. These Snowballs are curious freaks, the ostentatious members of the family.

Very similar to *V. tomentosum* is *V. sympodiale,* a common plant in the woods of central China. It grows taller than its Japanese confrere but has a less rigid flattened branching habit. Magnificent plants on their native heaths are the Japanese *V. furcatum* and the Chino-Himalayan *V. cordifolium* but alas! most difficult subjects under cultivation. Both have broad and handsome leaves which assume splendid tints of orange and crimson to vinous purple in the autumn. They are woodland plants delighting in rich cool soil and often grow epiphytically in the crotches of old trees. The flowers of *V. cordifolium*

are all perfect but *V. furcatum* has a ring of exceptionally large neuter flowers. In the spring these white blossoms are conspicuous from afar midst the forest undergrowth suggestive of suspended snowflakes.

The Old World species mentioned thus far except the Opulus group are beautiful in flower but have no outstanding virtues when in fruit. A very large number of Viburnums less spectacular in blossom than the above outshine them in ornamental fruiting qualities. Red fruits are always attractive and it is strange that outside of the Opulus section this color is absent among the ripe fruits of any Viburnum known from America, Europe or western Asia. But in the Orient there are a dozen or more species with red fruits and some of them rank among the finest ornaments of gardens. The best known is *V. dilatatum,* a compact shapely shrub of medium size with hairy shoots and producing its broad clusters of flowers toward the end of June. The flowers are followed by small bright red fruits in prodigious quantities which make it a most desirable garden plant. A related species is *V. Wrightii* with broader leaves and larger dark scarlet fruits. From China it has been my good fortune to introduce into western gardens about a score of Viburnums and one of these

is the red-fruited *V. theiferum.* This is a tall, rather narrow shrub with erect stems, long dark green rather leathery leaves and small white flowers. Not until the autumn does it stand forth as possessing conspicuous merit. Then with its hanging clusters of large egg-shaped, orange-red to scarlet fruits it proudly flaunts its charms and none can pass it by. On Mt. Omei, one of the five ultra-sacred mountains of China, an infusion of the leaves furnishes a "Sweet tea" which is famed for its medicinal properties and sold at much profit by the monks to pilgrims. China is very rich in these red-fruited Viburnums and there are eight to ten others in cultivation, most of them from seeds I sent home on my various trips. Among them are *V. betulaefolium, V. ovatifolium, V. brevipes* and *V. foetidum* with leaves varying much in shape; *V. lobophyllum* with bright green leaves of thin texture, *V. dasyanthum, V. Wilsonii* and *V. hupehense* with handsome scarlet fruits. The Japanese *V. phlebotrichum* and *V. erosum* both with red fruits are growing in the Arnold Arboretum but call for no special remark.

Well worth a place in any garden is *V. Sieboldii* with its shining green, strongly veined, five-inch long leaves, which when crushed emit a disagreeable odor. The flowers, which are cream-colored, are borne in

JAPANESE SNOWBALL, VIBURNUM PLICATUM

pyramidate clusters and the fruit turns from crimson to jet black when fully ripe. It is a vigorous, fast-growing and very hardy plant which will make a tree-like shrub fifteen to twenty feet tall.

All the Viburnums described above lose their leaves in the autumn but there is another extensive group with evergreen foliage available to those who garden in climates milder than that of New England —some of these, for example, *V. odoratissimum* and *V. cylindricum* vie with Rhododendron in nobility of foliage. The Orient is the home of nearly all, yet none is finer than the solitary south European species *V. Tinus,* the favorite Laurustinus, much grown in gardens for more than three centuries. Did I live in a climate favorable and had room for one plant only it would be this beautiful winter-flowering shrub. Dense-habited and much-branched of rounded form it grows from six to ten feet high and more in diameter and is furnished to the ground with dark, glossy green leaves. Every twig terminates in a broad cluster of white flowers which open any time between November and April and are followed by a crop of ovoid, deep blue fruits. For southern gardens the Laurustinus is one of the most useful of all evergreen shrubs forming rich masses of greenery, topped in season by a wealth of milk-white flowers.

Where the climate suits it will grow almost anywhere but flourishes best in full exposure.

A low-growing plant with leathery, dark green, conspicuously three-nerved leaves, white flowers and rich blue fruit is *V. Davidii.* This is an evergreen species, rarely more than two feet tall, branching freely and well-adapted for massing along open borders. It is a rare plant very local in distribution. I found it first growing among debris at the foot of some marble cliffs. It appealed to me strongly and I have retained a strong affection for this useful plant. In fact this and *V. theiferum* are my favorites among the species I discovered and introduced from China. A shrub with glossy, green leaves, greenish flowers and blue fruits is *V. propinquum* which has nothing much to recommend it to gardens.

A Viburnum that always pleased me is *V. utile* so common on the limestone cliffs around Ichang, where I spent several enjoyable and, I hope, profitable years. It is a much-branched twiggy shrub of open habit seldom more than six feet high but more through with narrow leaves, dark green above and clothed with a pale-gray felt on the lower surface, and three-inch broad clusters of fragrant flowers pink in the bud and later pure white. The fruits are black and shining. The rigid slender shoots of this plant are

in much request for stems of tobacco pipes among the Chinese. It is hardy in California but where exposed to strong winds loses many of its leaves during the winter and is apt to have a scrawny appearance in early spring.

A tender evergreen which grows into quite a large tree in the warmer parts of Japan is *V. odoratissimum* with pure white, fragrant flowers in broad panicles. The leaves are dull green, leathery, often eight inches long and four inches wide and taper to the base. It is much planted in temple grounds in Japan and China and there are or used to be some magnificent specimens in the Shanghai Public Gardens. A smaller plant is *V. japonicum* with lustrous dark green, ovate to rotundate leaves and broad flat corymbs of milk-white flowers. Much hardier than either of these is the Chino-Himalayan *V. cylindricum* which is sometimes a tree of forty feet tall. The dull green leaves are oblong from six to nine inches long and if rubbed or sharply bent they appear white from the presence of a waxy covering. The flowers are clustered, pure white, tubular with protruding stamens tipped with pale purple anthers and are followed by small, black fruits. The race in cultivation is Chinese being raised from seeds I collected and appears

to be hardier than the Himalayan which was first introduced into our gardens.

Very unlike other Viburnums is *V. Harryanum,* a discovery of mine in western China. This is of bushy habit, growing from five to eight feet tall, and has small, thick, rounded leaves singularly like those of certain Privets. So distinct is appearance in this plant that more than one authority smiled sarcastically when told it was a Viburnum. However, the advantage was with me since I had seen both flowers and fruits whereas he had to judge from leafy shoots. With stiff pyramidate clusters of white flowers, red changing to jet black fruits on red stalks and thick, lustrous dark green leaves *V. Henryi* is a strikingly handsome shrub. It is a large bush or small tree from eight to fifteen feet tall with rigid branches and leaves from four to six inches long which I introduced from China.

In some respects the ugly duckling among evergreen Viburnums and yet possessed of characters attractive to many people is *V. rhytidophyllum,* another introduction of mine. This is hardier than other evergreen species mentioned, flourishing in this country as far north as Providence, Rhode Island, where many fine specimens may be seen in the Roger Williams Park. It is a large shrub with oblong,

six to eight inch long leaves, strongly veined and much wrinkled, shining green on the upper surface, the lower being densely clothed with a pale gray felt. The flowers are yellowish white borne in broad clusters sometimes as much as ten inches across. Fruits are freely produced and as they ripen change to red and finally jet black. It is the enormous heads of these fruits and their changing color combined with the bold wrinkled foliage that has won for this plant so many friends. Unfortunately, in the winter the leaves hang straight down as if ashamed and the plant looks both sad and forlorn. It is a woodland species and should be given protection from strong winds. In its remarkable foliage this Viburnum is unique among the shrubs of temperate lands.

DOGWOODS

FLOWERS IN SUMMER, MULTICOLORED FRUIT IN AUTUMN, COLORED STEMS IN WINTER

THE DOGWOODS or Cornels are rich in ornamental qualities of flower, fruit, autumn foliage and colored stems in winter. An extensive group, it includes a number of the most beautiful, most hardy and most serviceable of trees and shrubs. The story of winter's severity in New England is told by the degree of perfection of the floral bracts of *Cornus florida,* and its brilliantly tinted red to crimson passing to pink foliage ushers in the glory of autumn. As the clustered flowers crowning the myriad stems of twiggy *C. racemosa* mark high summer so do the lustrous crimson stems of the Osier Dogwood *(C. stolonifera)* declare midwinter and the yellow clustered flowers of the Cornelian Cherry *(C. mas)* foreshadow spring.

In the woods and copses of the eastern United States there is no more lovely tree than the Flowering Dogwood *(C. florida),* the envy and despair of English gardeners. There is no more strikingly handsome flowering tree in the temperate forests of the northern Hemisphere than the wonderful *C. Nuttallii* of west-

ern North America, sometimes eighty feet tall with white chalices six to nine inches across so abundant as to drape the crown and the tree stands forth, in the spring a gigantic surplice, in the autumn a flaming pillar in the dark forests of Vancouver Island. The Bunchberries *(C. canadensis and C. suecica)* the diminutive brothers of these remarkable trees are not one whit less lovely nestling on rocks and starring with white the floor of our northern forests. In the dull gray days of midwinter nothing could be more cheery than the crimson stems of the Osier Dogwood *(C. stolonifera)*. And among the galaxy of ornamental fruits we fortunates enjoy what are more handsome than the clusters of rich blue fruits on the Silky Cornel *(C. Amomum)* and the pure white fruits topping the scarlet stalks of *C. racemosa*? These are native of North America but they have relatives in Europe and Asia possessed of rare beauty which have been brought to our shores by sundry agencies and are ours to enjoy at will.

The distribution of the members of the genus has many points of interest and several species illustrate the remarkable affinity of the floras of the Orient and of eastern North America. The genus is also unique among hardy woody plants in that its various members bear not only black and red (yellow in

one variety) but also white and blue fruits, colors very rare among hardy shrubs. In many of the Dogwoods the fruits are ripe in a month or six weeks after the flowers open. Contrariwise in others they ripen slowly. For example in the Cornelian Cherry *(C. mas)*, which opens its flowers in March or early April, the fruits are not ripe until late September and those of the Flowering Dogwood *(C. florida)* ripen still later.

The Dogwoods were among the earliest cultivated shrubs and have always retained a certain popularity yet they have never been given their full and rightful place in gardens. The superiority of the colored stems of Osier Dogwood and its forms has kept this Cornel in front rank with those who love gardens at all seasons of the year, but has a harsh enemy in fashion which herds the wealthy into town houses or southern lands to spend the winter. The distorted taste for variously variegated leaves has given forms of the related Old World *C. alba* an unduly prominent place in suburban gardens which time and culture will correct. The advent of the Asiatic Witch-Hazels (Hamamelis) removed the Cornelian Cherry *(C. mas)* from the doyenship of yellow-flowered spring shrubs.

The Dogwoods are all of easy culture although

some of the tree forms like *C. alternifolia* and *C. macrophylla* dislike transplanting. All like a good loamy soil, well-drained but with abundant moisture. They may be raised from seeds and those of osier-habit are easily propagated by cuttings in the winter; those of stoloniferous habit by offsets, others by layers. Their uses in gardens are manifold. As a specimen on the lawn nothing is finer than the Flowering Dogwood *(C. florida)* and its relatives, and grouped on the edge of woodlands or across a pond its charm is irresistible. For the effect of winter stems the same is true of the Osier Dogwood *(C. stolonifera)* and its relatives. These may also be grouped along driveways. The bush sorts are good anywhere but the tree forms should be associated with the deciduous trees on slopes where they can be viewed from above. Many of these have their branches arranged in tiers which form a series of table-like whorls and with their flowers standing erect their beauty cannot be gauged from below.

The Dogwoods may conveniently be classed into five groups each of distinct and outstanding garden value. Pride of place may be given to that which has the flower-clusters guarded and surrounded by large, handsome white bracts. In this group the conspicuous bracts are the floral feature and the tiny

flowers, agglomerated into a central button-like mass, may be ignored.

To those familiar with the woodlands of eastern North America from Massachusetts southward no description of the Flowering Dogwood is necessary, but less fortunate folk are entitled to consideration. This Dogwood is a slender tree from fifteen to forty feet tall, common as an understory in thin mixed woods of deciduous-leafed trees and has a thin, airy crown flattened and often in tiers. If examined in the autumn or winter the branches will be found to be dotted with gray rounded studs. As spring advances these swell and expand into a cross of bracts from four to six inches across at maturity, snow-white, becoming stained with pink as they age and fall. So freely are the white crosses produced that the woodlands in May when viewed from vantage points are filled with seemingly floating drifts of purest white suggesting droves of white butterflies hovering and flitting amid the trees.

Not every year is this Dogwood full of flowers. The trees are apt to overdo themselves and need an off year to recuperate and often, especially in Massachusetts, the winter frost may be so severe as to cripple or destroy the flowers. But in good seasons such for instance as the spring of 1926 the blossoming of

CHINESE DOGWOOD, CORNUS KOUSA CHINENSIS

Cornus florida is an event to be classed among the floral spectacles of the world. Visitors from other lands are captivated by its beauty and yearn to possess it. One spring, it was that of 1913, if memory serves me rightly, it was my privilege to walk around the Arnold Arboretum with Sir Herbert Maxwell, distinguished by his many accomplishments and none more so than the charm of his writings on plants and gardens. Said Sir Herbert with a sigh at the close of our peregrinations, "Give me your Dogwood, the rest you may keep!" But he knew full well this was impossible for since 1730 this Dogwood has been known in England where efforts to grow it successfully are unavailing. Here and there a flowering specimen is known, but insufficient summer heat more than the changeful spring weather is the cause of its failure under English skies. Its exquisite autumn-colored foliage has been spoken of but its fruit is worthy of praise. Teat-like and clustered several together, scarlet and erect it stands jewelling the branches in the fall.

The variety *rubra* with rosy red bracts is in great demand though to my mind less lovely than the type. But rightly placed, say on a slope above a pond and viewed across the waters in which its flowers are reflected, it is wondrously beautiful. Close inspection

of the flowers is apt to lower the high opinion thus formed since it will be seen that the bracts are only too often more or less malformed. It is often claimed that all the plants in cultivation have originated by vegetative propagation (mainly by grafting) from one individual tree discovered in the seventies of last century. As a matter of fact, the Pink Dogwood is beautifully figured on plate twenty-seven in Catesby's *Natural History of Carolina,* published in 1754.

The related *C. Nuttallii* of Vancouver Island and south to California is a much larger tree, sometimes eighty feet high, with a heavier, elongated crown and with heads of bracts, from six to nine inches across, expanding with the leaves, similar autumn tints and equally brilliant scarlet fruits. Unfortunately this tree of marvellous beauty cannot be grown in the New England climate and I do not know of a tree in the east. In the south of England, where its needs are understood, it flowers freely though there is scarcely a hope of its emulating its pristine glories.

These North American Dogwoods have their counterparts in eastern Asia where two species grow wild from the central Himalayas eastward through China and Korea to Japan but with these differences. The fruit is a conglomerate strawberry-like head and

the flower-bracts unfold after the leaves expand. They are small to moderate sized, flat-topped trees. That of the Himalayas and southern and western China *(C. capitata)* is known as the Strawberry-tree. It has pale yellow passing to cream-colored bracts and rather thick leathery leaves which assume no marked autumn tints. Naturally it is tender and suited only to the climate of California and the warm southern states. The other species *(C. kousa)*, distributed from central China northeastward through Korea and much of Japan, however, is perfectly hardy in Boston, Massachusetts. In the Arnold Arboretum its flowers are of greater bud hardiness than the native *C. florida* and in consequence it is an even more valuable garden plant. This is a strong statement but let me explain. It has this advantage in winter that its flower buds, though formed in the autumn, are folded within a pair of ordinary foliage leaves and have therefore additional protection. *Cornus kousa* does not flower until mid-June or later and its upstanding heads on rigid slender stalks have a foil of rich green leaves below. Thus although these Dogwoods of North America and the Orient are close relatives they are very dissimilar as garden plants and blossoming at different seasons there is

room for both and no necessity for invidious comparisons.

The floral heads of *C. kousa* are abundantly produced, from five to six inches across, and last for more than a month and finally become pink before they fall. The form from Japan to which the specific name belongs has been sparingly in cultivation in the west since about 1860. The central China type (var. *chinensis*) it has been my privilege and good fortune to add to gardens. In this the bracts are larger and broader and often overlap to form a closed, flattened involucre around the button-like mass of real flowers. Some experts acclaim this the finest gift of China to western gardens. Certainly it ranks high in the realm of beauty among hardy flowering trees and its fortunate introducer is proud of the opinion its merits have won for it. In the not distant future this Chinese Dogwood will be in great demand.

The red strawberry-like fruits of the oriental Dogwoods are from one-half to three-quarters of an inch in diameter and very attractive in the autumn suspended amid the vari-tinted often vinous purple foliage. They are edible and the orange-colored sweetish pulp is quite palatable though in it is imbedded several large, hard stony seeds.

It would seem a far cry of relationship from trees thirty to eighty feet tall to lowly herbs a few inches high. But a glance at the flowers shows that it is very close between the Bunchberries of North America *(C. canadensis)*, of Europe and northern Asia *(C. suecica)* and the Flowering Dogwoods. For shaded rockeries, woodlands and sheltered nooks there are no prettier little plants than these Bunchberries howbeit rather coy of naturalization unless they find soil and situation to their liking.

A common small tree in the woods of eastern North America is *C. alternifolia* with erect, flat corymbs of cream-colored flowers. This may be either a thin tree twenty-five feet tall or merely a cluster of erect stems forming a bush. In the autumn while the outer and topmost leaves are green the inner and lower are varying shades of red and the combination of tints is arresting. This typifies a second group of Dogwoods represented by many fine species in eastern Asia. The American plant is of inferior garden value and, moreover, strongly resents transplanting but its oriental brother, *C. controversa,* merits wide recognition. This is a fair-sized tree sometimes sixty feet tall, with a clean trunk seven feet in girth and tiers of tabuliform, wide-spreading branches forming a flattened crown.

The flowers are small, pure white and arranged in erect flat corymbs each from four to five inches across and abundantly produced. To get the full beauty of this tree in blossom it is necessary to look down upon it from some eminence. From such a position its crown appears as tiers of white from the countless thousands of its crowded heads of flowers. These are followed by innumerable bloomy black fruits, round and about the size of a pea with the stalks that bear them red in color. This is a quick-growing tree and one of the handsomest of recent introductions. It is widely distributed from western China, eastward to Japan and is very fond of wooded precipitous places. It has been confused with another species and the arguments as to its proper identity gave rise to the technical name it now bears. These two are the only Dogwoods with leaves arranged alternately on the stems and not in opposite pairs. They have a number of worthy tree relatives in the Orient with opposite leaves, indeed, this is the only prominent character distinguishing *C. macrophylla,* also widespread in the Orient, from *C. controversa.* It has a similar shaped crown, nearly identical fruit and abundant trusses of pure white flowers standing erect above the foliage. It is, however, a much larger tree. One other of this group

may be mentioned in *C. coreana,* which I introduced from the Land of Morning Calm in 1917 into the Arnold Arboretum, where it has proved quite hardy. This has a more irregular crown, smaller leaves and flower trusses and is remarkable for its deeply corrugated black bark fissured into tiny squares.

The third group of Dogwoods are all bushes and demand attention from the beauty of their fruits. They blossom in summer and their fruit forms and ripens with remarkable rapidity. The Silky Cornel *(C. Amomum),* a native of eastern North America may be mentioned first. This is a broad shrub, growing from eight to ten feet tall, especially valuable for the sides of ponds and streams where its long branches can hang gracefully over the water. It produces its heads of small yellowish white flowers in July and these are speedily followed by masses of bright blue fruits of rare beauty. Another native species also with charming blue fruits is *C. obliqua.* This is a more narrow and upright shrub with leaves silvery on the underside well-suited for border planting. A common and delightful wayside shrub in New England and elsewhere is *C. racemosa.* Of twiggy habit and suckering freely, its masses of slender stems form pure thickets seldom six feet tall, but often many yards through. In July it produces its

small white flowers in short panicles in enormous quantity. I mention that it is of twiggy habit and it is a pleasing sight to see a clump or thicket of this Cornel sway to and fro in a strong breeze with the crown of white flowers resembling foam on water. The fruits are pea-like and snow-white, maturing early and their beauty is heightened by the stalks which become bright red. Sturdy of habit with broad nearly round bluish green leaves with noticeably depressed veins is *C. rugosa,* also a native of eastern North America. This is a stout shrub growing some ten feet high and more broad with ivory-white flowers in compact clusters followed in early autumn by blue passing to white fruits. There are other American Dogwoods of this group and Asiatic ones too but we may close with mention of *C. paucinervis* native of central China which I introduced into cultivation. This is a spreading shrub growing from four to six feet tall with relatively thick and narrow dark green leaves and lustrous black fruits. It flowers in late summer and holds its leaves uncolored far into the fall. This and its late-flowering qualities and lustrous black fruit warrant its place in gardens.

Harbingers of spring are the fourth group, the Cornelian Cherries of Europe and northeastern Asia,

WHITE-FRUITED CORNUS RACEMOSA

Cornus mas and *C. officinalis,* whose star-like yellow flowers in clusters crowd the naked stems and cheer us long before the anger of Boreas has softened. These are sturdy shrubs with iron-clad constitutions and when planted in ordinary garden soil in any situation ask nothing but to be left alone. Yearly each opening spring they put forth their blossoms in profusion and in the autumn a crop of scarlet, globose to oblong, cherry-like fruits. They ripen their fruits more slowly and deliberately than other Dogwoods as if proud of the fact that these are edible and can be made into a palatable preserve. In southeastern Europe the inspissated juice of the fruit of *C. mas* is made into a sherbet and in the Orient that of *C. officinalis* is a valued medicinal drug. Of this group four species only are known and their distribution is interesting. Europe and the Orient claim the two mentioned above. A third species (*C. chinensis* with black fruit) grows in central China and a fourth *(C. sessilis)* in western North America. None is native of eastern North America.

The last group of Dogwoods is typified by the red Osier Dogwood *(C. stolonifera),* found from coast to coast in North America. This is a wide-spreading shrub which, suckering freely, forms a dense thicket, preferably in wet places. It has good

foliage, flattened heads of white flowers and white pea-like fruits. Its chief value as a garden shrub, however, is in the brilliant color of its stems throughout the winter, scarlet to crimson, lustrous in the warm sunlight, luminous and cheering on the bleakest and dullest of winter days. One form, known as *flaviramea,* has pale yellow shoots and is excellent in contrast with the type. In many ways similar but lacking the stoloniferous habit is the Old World *C. alba,* long known in cultivation. This is a wide-spreading bush, sometimes ten feet high, with finely colored red to crimson stems in winter. The only other member of this boreal group we need mention is *C. sanguinea,* the common Dogwood of Europe, whose specific name refers to the color of its foliage in autumn rather than the stems, which are much less highly colored than those of its relatives already expatiated upon.

SHADBLOWS

FOAM OF THICKET, COPSE AND SWAMP

TO THE great Rose family gardens are indebted for many of their finest plants in herb and bush and tree. Among these must be counted the Shadbushes, Shadblows, Juneberries or Service-trees, as they are variously called. The family name is Amelanchier and the trivial name Shadblow or Shadbush is in allusion to the fact that they blossom at the time when the Shadfish ascends the streams from the ocean. Juneberry denotes that the berries ripen in the month of June and Service-tree that the fruit is edible. In Europe the native species is known as the Snowy Mespilus. Of the various common names I like that of Shadblow best. These plants are essentially American, being found wild from Labrador south to the Gulf, and from Newfoundland west to the Yukon. A few outlying members of the tribe are natives of Eurasia, there is one in China and Japan, but in North America the species are many and the plants themselves multitudinous.

Most of the sorts are many-stemmed bushes of varying dimensions, some five of them are trees

of moderate size. They constitute a very important floral feature of our spring landscapes and their tinted foliage in autumn adds much to the brilliant autumn pageant of color. They abound in thickets, on the margins of woodlands, in swamps and open moorlands. With few exceptions the flowers are star-shaped, white, with relatively long, narrow, spreading petals and are borne in short, slender, spreading and ascending racemes. The leaves, which unfold at the same time as the blossoms or immediately afterward, are usually clothed with a white floss of hairs and the whole plant appears sheeted in snow-white apparel. In a few sorts the flowers as they open are tinted pink which is added beauty and in one common tree type the young leaves in pleasing contrast with the rest of the family are red-purple. All have slender branchlets of delicate tracery. In the spring landscapes they suggest waves of spindrift of snowy whiteness, floating or suspended through wood and thicket. Airy, graceful, muslined in white, the Shadblows have a bewitching loveliness fascinating and delightfully alluring. They are among the chief pleasures of a nature lover's April rambles and motor rides.

Like many other northern plants the Shadblows attend strictly to their own business in life. The

SHADBLOW, AMELANCHIER OBLONGIFOLIA

flowers are scarcely spent when the leaves thrust off their floss and spread themselves, smooth, green, cool and refreshing to look upon. In June the fruits, more or less globose and varying in shades of red to vinous purple or occasionally yellow and each as large as a blueberry, bear down the branchlets. In autumn the plants early put on yellow, orange, red to crimson garments and dally brilliantly garbed for nearly a month.

A strong family likeness pervades the whole group. All have smooth steel-gray bark, hard and heavy wood, slender branches and oval to roundish leaves variously toothed on the margin. The fruit is edible and in some sorts quite palatable. Their cultivation is easy for they are vigorous and accommodating and thrive in any ordinary soil provided it is not too alkaline nor permanently water-logged. They rather like limestone and love good loam and leafsoil. The bushy types send up suckers freely from the roots and soon make thickets. These are splendid for boundary planting or for the wild garden. The tree sorts are fine as specimens a little removed from the dwelling house where their beauty may be glimpsed from the windows. All are easily propagated by seed and the bush forms may be increased by lifting the sucker-growth and by layering. In

Europe the pernicious practice of grafting these plants on Hawthorn stock still prevails, though an enlightened public is fast forcing its abandonment. There is no excuse for this senseless method and no one should buy a Shadblow so grafted.

Although they fill a niche and add welcome beauty of any garden Shadblows are difficult to procure. Their loveliness, notwithstanding, nurserymen have treated them with contumely for are they not common native plants? A few of the more enlightened and progressive, however, are beginning to catalogue them which is an encouraging sign of the awakening that is taking place. That gardens are entitled to enjoy the best in herb and vine, shrub and tree is my creed and I would have justice done to what is native as well as to what hails from other lands.

I have mentioned the wide distribution of the Shadblows in America and of the strong family likeness that prevails. The result is considerable confusion in their identity and this is rendered more difficult by the fact that a number of natural hybrids exist. In recent years the species and hybrids native of eastern North America have been straightened out but those of the west have not yet been so fortunate. In the Arnold Arboretum where these plants have been extensively planted about twenty-two species

and hybrids are cultivated and the pick of these I will now pass in brief review.

The earliest Shadblow to blossom is *Amelanchier canadensis* which is native of western Massachusetts and western New York south to the Gulf Coast. Described by Linnaeus in 1753, other sorts have usurped the name and the true plant has long been rare in gardens. It is a tree, at its maximum full sixty feet tall, with a trunk five feet in girth and a dense round-topped crown of thin branches; the blossoms as they open are often tinged with pink and are produced in ascending and nodding racemes. The flowers expand at the same time as the leaves, which are clothed with a floss and the whole tree is wreathed in snowy whiteness.

As the petals of *A. canadensis* fall and the white fluff of its foliage is flung off the flowers of *A. laevis,* a second tree species, expand. This Shadblow has dark red-brown young leaves almost destitute of hairs and in fine contrast erect or nodding racemes of pure white flowers. Wide-spread from Newfoundland south this is a tree up to fifty feet tall with a trunk five feet in girth and a rather open narrow crown. The ruddy tinted young foliage gives to it distinction and character and associated with other deciduous trees it is most effective in springtime.

One of the loveliest of all is *A. grandiflora,* a natural hybrid between the two species named above. Like its parents this is a tree but it puts forth blossoms before its leaves and the flowers are much larger than those of any other American Shadblow. The blooms also last long in unsullied whiteness and the plant stands forth an aristocrat. This hybrid grows wild in the woods around Rochester, New York, where a lovely form of it *(rubescens)* with rose-tinted blossoms also occurs.

The third American tree species is *A. alnifolia,* known to the Indians of the northwest as the Saskatoon. It is a slender tree rarely exceeding twenty-five feet in height with a loose crown of irregular shape and white flowers in erect racemes opening at the same time as the leaves which are densely clad with evanescent white floss. Its fruit is sweet and juicy, nearly globose in shape, dark blue-black often three-quarters of an inch in diameter and larger and more valuable than those of any other Shadblow. Found over an immense area of country from the southwestern shores of Lake Superior, west and northwest to the valley of the Yukon River, it is an important tree to the Indians who gather and dry the fruit which serves them as a valuable article of food.

The largest of the bush Shadblows is *A. oblongi-*

LOVELY AMELANCHIER GRANDIFLORA

folia, a very common species through eastern North America. This shrub grows fully eighteen feet tall and forms dense oval clumps of many erect stems sometimes twelve feet through. Its flowers and leaves with white cottony covering unfold at the same time. Throughout New England this species is a conspicuous feature of the landscape in spring with its blossoms, in June with its wealth of fruit and in autumn with its vari-colored foliage. All round this is probably the best of the large shrubby Shadblows.

Another common sort is *A. spicata* which grows from six to ten feet tall and is distinguished by its erect dense-flowered racemes. *A. humilis* is dwarf and twiggy, and *A. stolonifera* spreading from underground stems forms low thickets. Both are well suited to the wild garden. So too, is *A. florida,* native of the northwest which produces a mass of erect stems from eight to ten feet tall and has rich yellow autumn foliage. Handsome also are *A. sanguinea* and *A. amabilis,* both shrubs of good size with relatively large blossoms.

Quite distinct is *A. Bartramiana* the pigmy of the family. This, an inhabitant of boglands from Labrador southward, has large milk-white, broad-petaled almost saucer-shaped flowers, solitary or rarely in few-flowered clusters. Growing from a

few inches to a fathom tall it is a distinct and pleasing little plant of twiggy habit and is very floriferous.

There are other American Shadblows, some of them confined to limestone, but one cannot mention all. The real point to be remembered is that all and sundry of the Amelanchier tribe are worth a place in the garden. In our parks they should be planted in quantity, in clumps or singly as specimens, for they add grace and beauty and demand but little care.

The European species is known by several names, most widely perhaps as *A. vulgaris* but correctly as *A. ovalis,* although *Standardized Plant Names* would thrust *A. rotundifolia* upon a long suffering public. It is the oldest known Amelanchier and has been in cultivation for upwards of two hundred years. A native of central and southern Europe it is usually a shrub but under favorable conditions forms a good-shaped tree from eighteen to twenty-five feet in height. It has stouter branchlets, larger, fatter, more ovoid winter-buds than its American kindred. Also it produces the largest flowers of any species, each blossom being often one and one-half inches across and clustered in erect racemes. The leaves with their coat of woolly hairs unfold at the same time and the whole plant appears mantled in white. In Europe it is called Snowy Mespilus, a pleasing and

very applicable name. It is one of the latest to blossom.

The Oriental Shadblow *(A. asiatica)* is a small tree from fifteen to twenty-five feet tall with a flattened crown of irregular outline. It is rare in Japan and Korea but in central China a variety, named *sinica,* is one of the most common and most beautiful of the lesser trees. An inhabitant of thickets and thin woods it is abundantly floriferous and in spring the trees are conspicuous from afar. The flowers are large, white as driven snow and produced in spreading and nodding racemes. It is a great favorite of mine recalling many a pleasant ramble in the heart of China and Japan. Unlike all other Shadblows the fruits do not ripen until late September or October and unless eaten by birds hang on the trees throughout the winter. The autumn foliage, yellow, orange to crimson, is particularly brilliantly colored.

AMERICAN CRABAPPLES

PINK BLOSSOMED AND VIOLET SCENTED

MONG the lesser trees of North America well-suited to adorn the gardens, parks and margins of woodlands are the several species and varieties of Crabapples. If the records are correct it was in 1724 that the first of these Crabapples *(Malus coronaria)* was introduced into cultivation, yet two centuries have been insufficient for this tree to attain in our gardens the position which its merits entitle it. Another species *(M. angustifolia)* is considered to have reached the shores of Britain in 1750. It was certainly known to Loudon but seems afterward to have disappeared from cultivation until its reintroduction a few years ago. The western *M. fusca,* introduced in 1836, has an equally chequered history. The lack of appreciation which American Crabapples have met with is indeed remarkable. As a group they are still imperfectly known to botanists, tree lovers and gardeners and only two or three of them can be found listed in the catalogues of nurserymen. The introduction of the remarkable Bechtel Crabapple *(M. ioensis* var. *plena)* with clustered, double, rose-like, pale pink blossoms,

each two and one-half inches across, was an event in the history of horticulture and attracted attention once more to American Crabapples. Bechtel's Crab is named for Mr. E. A. Bechtel, who in 1888 brought it into commerce and is a natural variety which had been known to settlers around Staunton, Illinois, since about 1850. The flowers, which have the delicate odor of violets, are produced in the utmost profusion and when in blossom the charm of this lovely tree is irresistible. At its best this Crabapple is a tree twenty-five feet tall with wide-spreading branches forming a fine crown. In gardens it has the reputation of being short-lived but this is not strictly true for it is the grafting on common Apple stock that is to blame not the tree itself. None of the American Crabapples are happy on this alien plant. The species should be raised from seeds and the double-flowered forms and other special kinds grafted or budded on stock of the American species, the best for this purpose being *M. ioensis*. If this be done no more will be heard about the trees being short-lived.

In America species and varieties of Crabapples grow wild from the Atlantic sea-board westward to the valley of the Mississippi River and south to eastern Texas. None is native of the arid regions of the west and only one species *(M. fusca)* is indigenous

west of the Rocky Mountains. In all nine species of these trees with several varieties and hybrids are now recognized. All the known species, three hybrids and most of the varieties are cultivated in the Arnold Arboretum where they are quite hardy. Some of them have been growing there for forty years and are trees of goodly size. The more recently recognized forms are small plants and it is too soon to attempt to appraise their garden value.

The American Crabapples in habit of growth, in the fragrance of their flowers and in the character of their fruits are quite different from the Crabapples of Asia and Europe. They form a unique section but the species themselves are not easily defined and there is a strong family resemblance among all of them, except the western *M. fusca*. All are large arborescent shrubs or small trees with a short trunk and an open rounded crown of wide-spreading branches and spiny branchlets. They have a marked tendency to spread and form pure thickets. On this account they are excellent for planting in the borders of woods and in woodland glades. As specimens they are suited to the park or wild garden but those with double flowers are best associated with house, lawn or walled garden, while on account of their delightful fragrance they are worthy of a place beneath my

BECHTEL CRABAPPLE, MALUS IOENSIS PLENA

lady's window. All have pale to rose-pink flowers with the delightful odor of violets and do not open their blossoms until the leaves are partly or nearly full grown. The fruit, except that of *M. fusca,* is depressed, globose, usually broader than high, from one to two and one-half inches in diameter, hanging on long slender stalks and green or pale yellow in color, very fragrant and covered with a sticky, waxy secretion. The flowers commence to open late in May or early in June, after those of the Asiatic species are past and so serve to lengthen the season of Crabapple blossom. A good loamy soil is what they require and if it be impregnated with lime so much the better. The cultivation of these hardy trees offers no difficulties and for their late-flowering qualities, their fragrant flowers and peculiar fruits the American Crabapples are worthy of wide recognition.

A beautiful tree, sometimes thirty feet high with a wide-spreading open crown and a short trunk and pink flowers, each from one to two inches across, produced in clusters of from four to six is *M. coronaria,* sometimes called the Garland tree. It is characterized by its leaves, which are smooth at maturity and green on both surfaces, rounded at the apex and narrowed at the base, with rather rounded teeth and

usually only slightly or not at all lobed. This is the common eastern species although it does not approach the coast north of Pennsylvania and Delaware and is found so far west as Missouri. A form with long pointed leaves (var. *elongata*) sometimes forms dense impenetrable thickets on the southern Appalachian Mountains. About twenty-five years ago a double-flowered form was found growing in the woods near Waukegan, Illinois, by Mrs. Charlotte M. de Wolf. This has been named var. *Charlottae*. The flowers are rose-color in the bud and when expanded are about two to two and one-half inches across, white suffused with delicate pink. Each flower has about sixteen petals and some forty stamens with brown anthers. Its discoverer is, unfortunately, now dead but her memory will ever be kept green by this lovely floriferous tree.

Mention has been made of the Bechtel Crabapple but it is necessary to say something about its parent *M. ioensis,* the Iowa Crabapple, which is common through the northern middle states to Texas. This is a very variable species of which many varieties have received names but though they often look very distinct they are all connected by intermediate forms. The Iowa Crabapple is a tree up to thirty-five feet in height with a trunk five feet in girth, a wide-open

head of spreading branches and usually incised leaves clothed with woolly hairs on the lower surface. The flowers are pale pink to rose-color, each about two inches across and are borne in clusters of about six. The shoots are very downy and the lesser branchlets often spiny. From *M. coronaria,* with which it is often confused, the Iowa Crabapple is distinguished by its persistently hairy leaves which are also much more cut and lobed. There is a hybrid of *M. coronaria* and the common Apple named Mathew's or Kentucky Mammoth Crabapple, said to have been found wild in Kentucky somewhere around 1870. It is a strong-growing tree with clustered, rose-pink, fragrant blossoms, each more than one inch across and produced in rich abundance. The fruit is flattened-round, greenish in color and one inch and more in diameter. It is very hardy and worth while.

What is believed to be a natural hybrid between the Iowa Crabapple and some forms of the orchard Apple has been named *M. Soulardii.* As it grows in the Arnold Arboretum this tree is nearly as broad as it is high with spreading, slightly drooping branches which bear a profusion of large pink blossoms that last for about ten days. Curiously enough it flowers fully two weeks before either of its supposed parents.

Several varieties of Soulard's Crabapple are recognized by American pomologists. One of these known as the Fluke Apple is quite ornamental and flowers and fruits abundantly each year with us. It is well worth the attention of orchardists as is *M. Soulardii* itself and the new *M. platycarpa.* This last-named is remarkable in having the largest fruit of any known Crabapple species. It is native of the southeastern states where the fruit is used for preserves. The flowers are about one and one-half inches across and the fruit, which is green and much broader and long, is often two and one-half inches in diameter with a deep cavity at base and apex. This is a small tree, rarely twenty feet high with a spreading crown of twiggy branches and is worth growing for its decidedly handsome and also useful fruit.

The first of the American Crabapples to open its blossoms is *M. glaucescens,* so named from the pale gray color of the under surface of the leaves. This is a shrub rather than a tree which seldom exceeds fifteen feet in height. The flowers are pale to rose-pink, each about one and one-half inches in diameter and the fruit is pale yellow. Though only recently recognized as a distinct species this is a common wild plant in western New York State, southern Ontario and elsewhere.

HYBRID MALUS SOULARDII

The western Crabapple, *M. fusca,* more generally known as *M. rivularis,* grows wild on the Pacific slope from Alaska to northern California. It has short-oblong, yellow-green flushed with red, or red and yellow fruit, about one-half to three-quarters of an inch long with a deciduous calyx and is entirely without the waxy secretion peculiar to all other American species. In fact its relationship is with certain species of eastern Asia and not with those of America. The flowers of *M. fusca* are small, white, or white tinted with rose-color, and are produced in clusters of from six to twelve. The tree is sometimes forty feet tall with a spreading crown and a trunk six feet and more in girth, often however, it is merely a bush or arborescent shrub. A hardy and vigorous grower, this Crabapple was introduced into gardens in 1836 but has remained rare in cultivation.

A hybrid of *M. fusca* and the common Apple tree appeared in the Arnold Arboretum many years ago from seed collected in Oregon and has been named *M. Dawsoniana.* The tree has grown to more than double the size of its western parent to which it shows relationship in its oblong fruit, the shape and color of that of *M. fusca* but about twice the size. The leaves are less hairy than those of the common Apple and the flowers are rather larger. The hybrid

blooms at about the same time as *M. ioensis* and a few days earlier than *M. fusca.*

The Crabapple season of flowers closes with the opening of the blossoms of *M. angustifolia,* a southern species which does not grow wild north of southeastern Virginia and southern Illinois and is found south as far as northern Florida and western Louisiana. It is a tree thirty-five feet tall with a short trunk from three to four feet in girth and a loose open crown of wide-spreading branches, pure pink, exceedingly fragrant flowers, each about one and one-half inches across and a depressed globose fruit. From other species it differs in the only slightly lobed or sharply toothed leaves on the vigorous shoots and in the rounded apex of the leaves on the flower-bearing branchlets. Although it is native of the warmer states this tree is perfectly hardy in the Arnold Arboretum. There is much character in its crown or rigid-spreading branches and when in flower the air is perfumed with the delightful violet-odor of its countless blossoms. This species is said to have been introduced into England as early as 1750; it is figured in 1828 in the *Botanical Register* from a tree that flowered in the Horticultural Society's garden at Chiswick. It appears never to have established itself in gardens and seems to have become lost until re-

cently reintroduced. There is no more beautiful Crabapple than this species and its absence from gardens in general is to be deplored.

Three other species, *M. glabrata* of the high mountain valleys of North Carolina, *M. lancifolia* widely distributed from Pennsylvania to Missouri, and *M. bracteata,* a common species from Missouri to Florida, are now growing in the Arnold Arboretum but the plants are young and have not yet flowered freely. As they grow in a wild state these are decidedly handsome Crabapples, worthy with their kinsmen of a prominent place in our gardens.

HAWTHORNS

A NEGLECTED GROUP, FLORIFEROUS AND ABUNDANT OF FRUIT

NORTH AMERICA, of her trees and shrubs, has made three contributions of tremendous import to the gardens of the world. The first of these is the group of shrubs, typified by Azalea, Kalmia and Vaccinium and collectively grouped under the family of Ericaceae which are valued for their foliage, their blossoms, their ornamental fruit, or for all three. For more than a century these have been esteemed in gardens, especially those of Europe where they have won for themselves the generic title of *American Plants*. The second contribution is that of Conifers without which gardens would be woefully incomplete and would lack some of their noblest ornaments. The third great contribution is that of Hawthorns, multitudinous in variety and of inestimable value to northern gardens producing as they do flowers of snowy whiteness in abundance and a wealth of brilliantly colored fruits. The Ericaceae and Conifers are everywhere known and play a prominent part in beautifying the gardens of North America and Europe. The

Hawthorns on the contrary are only just beginning to win tardy recognition. For those countries where the winter climate is severe, and especially for regions where the soil is impregnated with lime, no other group can furnish such a variety of plants with conspicuous flowers, handsome fruits and brilliant autumnal leaves. The Hawthorn or May-blossom is one of the glories of the English countryside and it is high time that some of its American brothers and sisters received proper recognition in parks and gardens.

Hawthorns form the genus Crataegus and the variety native of eastern North America is amazing. Sargent in volume IV. of his *Silva of North America* published in 1892 admits fourteen species of tree Hawthorns; in the edition of his *Manual of The Trees of North America* issued in 1921 there are enumerated 153 species. There are sceptics who smile at the number of species recorded from America but the problem may well be left for posterity to decide. The one indisputable fact is that the critical investigation of Crataegus during the past twenty-five years has brought to light a great number of trees and shrubs, beautiful in flower, autumn foliage and fruit, of extreme hardiness and pre-eminently suited for planting in the parks and gardens of the coldest of in-

habited countries. They thrive alike in the pure air of the country and in the smoke-laden atmosphere of mining districts.

In these days when the love of gardens is greater than ever before in history it is important that our attention be directed toward permanent garden material of easy culture and perfect hardiness. Plants which once established will look after themselves and yet delight the eye with their beauty of form, of foliage, flowers or fruit have the greatest value. It is here that hardy trees and shrubs come into their own and there is no lack of splendid material. The whole northern hemisphere has been ransacked to this end and we have today an abundance such as the founders of our gardens never dreamt of. These wise builders made full use of the trees and shrubs they knew and we have inherited a legacy of beauty and restful charm, though in our efforts towards improvements, so-called, we have often destroyed much that were better left intact. A century and more ago several groups of trees played a much more important part in garden and park landscapes than they do today. One has but to turn to the writing of that grand old gardener, Loudon, to realize the truth of this. One prized class which has become neglected is that of the Hawthorns or Crataegus, the largest

group of hardy trees and shrubs that can be grown in northern gardens.

The genus Crataegus is universally distributed through the northern Hemisphere but the greatest concentration of species is found in the United States of America from the Atlantic coast westward to the valley of the Mississippi River. Its northern limits approximate to the Arctic Circle and its southern to the Tropic of Cancer. In China, a country notorious for its wealth of plants, Hawthorns are remarkably few in species and individuals though in the northeast of that land grows *C. pinnatifida,* one of the very finest of all. A strong family resemblance is apparent in the foliage and flowers of all the members though they vary in habit of growth and greatly in color and size of fruit. The flowers of all the species are white, but the size and number in the cluster differ as do the number of stamens and color of the anthers and these characters are much used to discriminate the species. The wood is hard and heavy yet in some like *C. cordata* it is brittle. The shrubby species, except where collections are favored, have no outstanding use in gardens. Those of arborescent habit on the contrary are of immense value for the park and lawn and for trimming into hedges, since

they are long-lived and ornamental at all seasons of the year.

No trees are more easily grown. A good loam, and if lime is present so much the better, and an open, fully exposed situation are the essentials. Hawthorns love the wind and sun and should be given plenty of room for their full development. The plants should be raised from seeds for although these do not germinate until the second season and the seedlings are slow for the first year or two the results well repay the time and patience expended. Grafted plants except of special forms like those of the common Hawthorn should be avoided since they lead to disappointment. Transplant the seedlings several times in order to develop a good root-system unless they can be early placed in permanent sites. Our custom is to plant in well prepared pits about three seedlings when about two feet tall and later if all grow to cut out two. Beyond the shortening of over-strong laterals and the removal of cross branches little or no pruning is required. Like other members of the Rose family, Hawthorns are subject to attacks of scale-insects which may be easily controlled by a winter spray of lime-sulphur, one gallon to eight gallons of water.

In their fruits the Hawthorns have a wide range

ARNOLD THORN, CRATAEGUS ARNOLDIANA

of variation in color, size, time of ripening and persistence on the trees. It is edible on all species though in three only and these native of widely separated areas is it of comestible value. One of these is the Azarole *(Crataegus azarolus)* native of Asia Minor, which bears globose fruit, about an inch in diameter, of apple-like flavor and orange, yellow or reddish in color. In southeastern Europe this Hawthorn is much grown for the sake of its fruit. Native of the high mountains of Mexico is *C. stipulosa* with globose, yellowish, dotted, long-persistent fruits each nearly an inch in diameter. This is a small, sparsely spiny tree, seldom twenty feet tall. The third species with comestible fruit and one of the most handsome of all Hawthorns is *C. pinnatifida,* a native of continental northeastern Asia. In northern China, Manchuria and Korea it has been cultivated as an orchard fruit for we know not how many centuries with the result that forms, such as the variety *major,* with large fruits each more than an inch in diameter have arisen. This is a tree from twelve to twenty-five feet tall with pale gray-green bark, large, lustrous green, deeply-lobed leaves inclined to be pendent, many-flowered clusters of very large flowers and oblong to flattened-round crimson fruits in autumn.

With its bright blue fruit about half an inch in

diameter *C. brachyacantha* is unique among the host of Hawthorns. It is the "Pomette Bleue" of the Arcadians of western Louisiana and is a large tree with shining green foliage and small flowers many together in crowded clusters. This is native of the extreme southern part of Arkansas, eastern and western Louisiana and eastern Texas where it grows gregariously in areas often submerged during a part of the year and when in bloom it is a conspicuous feature of the landscape.

A number of species have yellow fruit. Of these *C. flava,* a small tree of about twenty feet in height with more or less pear-shape fruit, may serve as an example. This is the type of a section comprising many species all native of southeastern United States and characterized by the conspicuous glands on the mostly obovate-cuneate leaves, petioles and corymbs, and by their few-flowered clusters.

Among the Hawthorns with orange-colored fruits none is more handsome than the central Asian *C. Wattiana.* This is a tree of moderate dimensions with bright green, ovate, sharply incised leaves and clusters of translucent hanging fruits, which ripen during the last week in August. The flesh is soft and the fruit in appearance is as tempting as a grape, but it soon wilts and by the middle of September has

either fallen or hangs shrivelled and dried upon the trees. Quite a number of species have lustrous black fruits but they are of lesser garden value though many are large and handsome trees. Of this group *C. rivularis* from the southern Rocky Mountains and *C. Douglasii* of the Puget Sound region of western North America serve as excellent types. Both are trees up to forty feet tall with rather fluted trunks clothed with gray bark. The first-named is fairly pyramidal in habit whereas Douglas' Thorn has a rounded crown.

One of the most widely known of American Hawthorns is *C. punctata,* which has fruits of various colors. On some trees it is red, on others yellow, orange or rose-color. This species is very widely distributed in eastern North America and is a tree from twenty-five to thirty-five feet tall with a flattened or rounded crown of wide-spreading branches sometimes forty feet and more through. It was introduced into cultivation in 1746 and is peculiar in the fact that some individual trees have flowers with yellow and others with rose-colored anthers; the trees with yellow anthers produce yellow fruits and those with the rose-colored anthers have red fruits.

The great majority of Hawthorns have red fruits varying from dull red through shades of scarlet to the

richest crimson, whilst some have in addition a purple bloomy covering. It is these red-fruited kinds that are the most ornamental and desirable. To this great group belong *C. monogyna* and *C. oxyacantha,* common throughout the greater part of Great Britain and with which all are so familiar that any description is superfluous. There are many named sorts of both species and among them forms with red flowers, both single and double, a feature unknown among all the other vast array of Hawthorns. Few trees are more appreciated than Paul's Double Scarlet Thorn and richly does it deserve the honorable place it has won in the affection of garden lovers. Another form *(albo-plena)* has double white flowers, another *(pendula)* is of weeping habit, another *(stricta)* has erect branches. The Glastonbury Thorn *(C. monogyna* var. *praecox)* around which pretty legendary lore has gathered is remarkable in flowering in November and December. The fruits of this Hawthorn are less brilliant in color than those of many other species but the variety *Gireoudii* with lustrous red oblong fruit is exceptionally fine.

Of American red-fruited Hawthorns the first to ripen its fruits is *C. arnoldiana,* a small tree with a broad crown of ascending and spreading branches and slender very zigzag branchlets. The fruit is as

LONG-SPINED CRATAEGUS MACRACANTHA

large as a cherry, bright crimson and is abundantly produced. From mid-August until mid-September this is one of the most conspicuous trees in the Arnold Arboretum. A closely related species with equally large fruit which ripens about mid-October is *C. arkansana.* Very beautiful in fruit in late September until the middle of November is *C. succulenta* with its wealth of bright scarlet globose fruits in drooping clusters. A round-topped, densely branched tree is *C. coccinioides* with bright orange and scarlet autumn foliage and erect clusters of shining crimson fruits which ripen and fall during the month of October. Another species with orange-red fruit is *C. aprica,* a slender tree some twenty feet tall, native of the low valleys of southern Appalachian region.

Handsome in flower and fruit is the broad-crowned *C. rotundifolia,* the most northern in its range of all American Hawthorns. Well-known is *C. crus-galli,* the Cockspur Thorn, with its formidable spines, rigid, spreading branches and drooping clusters of sub-globose, dull red fruits which ripen in late October and remain on the branches until spring. This is the type of a large and well-defined group of which other worthy representatives are *C. fecunda* with orange-red fruit and *C. macracantha.* The last is most appropriately named for it has the longest

spines of all the Hawthorns and so thickly set on the branches are the spines that no animal will face the tree or break through a hedge formed of it. The Rochester Thorn *(C. durobrivensis)* is especially valuable for the garden in winter because its large dark crimson fruit remains uninjured by frost until long past midwinter. Another species which holds its fruit late is *C. pruinosa* with a purple bloom. But of all the late-fruiting kinds none excel *C. cordata,* the Washington Thorn, and *C. nitida.* The first-named was introduced into cultivation in 1738 and is one of the most distinct of all. It is a slender tree from twenty to thirty-five feet tall with a small and shapely crown, nearly triangular leaves which turn bright scarlet at the end of October. It is one of the latest to open its flowers and its small lustrous scarlet fruit in clusters remains on the tree until spring with little loss of beauty. Very different in habit is Sargent's *C. nitida,* native of the bottomlands of the Mississippi River with wide-spreading lower branches and erect upper branches forming a broad rather unsymmetrical head. It is a tree often thirty feet tall with a tall straight trunk and carries its shining, scarlet fruit in abundance right through the winter.

Since the variety of Hawthorns is so bewilderingly

great it may help garden lovers if the names of a selection be given. Of the American species the following dozen may be equalled but in my opinion are not excelled:

C. arkansana	*C. fecunda*
C. arnoldiana	*C. nitida*
C. coccinioides	*C. pruinosa*
C. cordata	*C. punctata*
C. crus-galli	*C. rotundifolia*
C. durobrivensis	*C. succulenta*

Of the Old World species I would select the following *C. azarolus, C. orientalis, C. pinnatifida* and *C. Wattiana,* with forms of the English *C. monogyna* and *C. oxyacantha* to make the half-dozen.

SPINDLE-TREES

BURNING BUSHES HUNG WITH GLOWING LAMPS

THE value of Evonymus or Spindle-trees dwells in the beauty of their fruits, in the rich evergreen foliage of certain kinds, and in the brilliant autumn tints of others. I know but one species which has conspicuous flowers and that is *E. grandiflora,* native of western China and the Himalayas. A small evergreen tree with pendent clusters of cream-colored flowers each three-quarters of an inch across, this plant is exceptional in the family and no other has any marked beauty of blossoms. Evonymus are deciduous or evergreen trees or shrubs, or vines which cling and creep by means of roots emitted along the stems. The larger growing sorts are splendid specimens on the lawn or on the edge of woodlands; others like *E. patens* and *E. japonica* are, where climate admits, valuable evergreens and by the seashore of inordinate value as hedge-plants. Dwarf sorts like *E. nana* and *E. obovata* are good groundcovers, and where the Ivy is not hardy the oriental *E. radicans* is the best substitute available, being excellent for

clothing buildings, for border edgings and under trees as a groundcover.

The genus is marked by its opposite leaves, small and numerous flowers in stalked clusters arising from the axils of the leaves, and by its erect or hanging fleshy capsular fruits, which open and display seeds immersed in brightly colored jackets. The various species are native of the temperate regions of North America, Asia and Europe. In all about seventy species are recognized and about half of this number are in cultivation. The wood is white and strong and in earlier times that of *E. europaea* was in great demand for making spindles for use in looms, hence the name Spindle-tree. Few have any economic value but in India the bark of one species *(E. tingens)* is used in preparing the yellow dye with which the Hindus make the sacred mark on their foreheads.

The Spindle-trees are easily grown in good well-drained loam and are readily propagated—the deciduous sorts by seeds, the evergreen by cuttings or layers. As will be told under the particular species a few have marked preference for certain situations but the rank and file are not particular in the matter of site. Scale-insects are the worse pests and where the summers are hot and dry it is scarcely worth while attempting to grow *E. radicans* and its forms.

In New England, however, the pest is easily controlled by spraying in winter with lime-sulphur in the proportion of one gallon to ten gallons of water. Mildew is a nuisance in certain places on *E. japonica* and spraying with a solution of sulphur is needed. The deciduous-leafed sorts are much less bothered by pests of any sort.

The most popular perhaps of the deciduous-leafed Evonymus is *E. alata,* a very worthy plant which grows into a broad flat-topped bush, some five to eight feet tall and from eight to twelve feet through, with stiff, wide-spreading, cork-winged branches. Throughout the summer it possesses little that is attractive in character for its leaves are dull green and its flowers quite inconspicuous. In the autumn, however, it assumes the most brilliant tints of rosy scarlet to crimson and well deserves the name of "Burning Bush," so often applied to it. The fruit is small, usually one-seeded, freely produced and dull purple in color with scarlet coated protruding seeds. In the winter this shrub is conspicuous with its rigid, wide-spreading branches with prominent corky wings, but on old plants the cork is less developed on the branches. Though common over a wide area of the Orient it is particularly abundant in the Nikko region of Japan where Maples also luxuriate. In the au-

BURNING BUSH. EVONYMUS PLANIPES

tumn many tourists when acclaiming the wondrous autumn tints of the Maples have this Evonymus in mind though they do not realize it.

Another favorite is *E. europaea,* which is a shrub or small tree, sometimes thirty feet high, with a spreading bushy head and dark green usually oblong-lance-shaped leaves which fall without undergoing much change in color. The fruit is abundantly produced in hanging clusters and when ripe is red and the seeds orange color. There is a good variety with white fruits *(fructu-albo),* another *(purpurea)* with the young shoots and leaves suffused with purple; there are also forms with white and yellow variegated leaves. None is better than the type, a well-grown plant of which is among the most beautiful objects northern gardens can boast.

Very lovely in fruit is *E. Bungeana,* a native of north China and introduced into our gardens from Pekin in 1883. This is a slender tree often thirty feet tall with numerous thin branches forming a narrow crown, light green lance-shaped leaves on long stalks, easily moved by the breeze and changing to yellow in the autumn. In the Arnold Arboretum it fruits abundantly, the ripe capsule changing from pale yellow to pink and displays rose-colored seeds. The fruit is small, not more than half an inch in

diameter, but there are many in each cluster, and no Evonymus is more prolific. The fruits keep the pink color until severe frosts set in when they bleach and finally become gray-brown. On account of its tall habit it is a good plant for the margin of woodlands and may be used to great advantage as a screen. It is perfectly hardy and flourishes in New England. Similar in color of foliage and fruit is *E. semipersistens,* but this is broader in habit and retains its leaves into December. In the Arnold Arboretum this is the last of deciduous trees to shed its leaves, which remain fresh and green until severe frosts set in when they fall without undergoing much change in color.

The Chinese *E. lanceifolia* grows to a larger size than any other Evonymus hardy in New England. In China I have seen trees fifty feet tall with trunks nine feet in girth clothed with dark corrugated bark. The branches are stout and the leaves broad with deeply impressed veins. It is a vigorous plant and in the fall when laden with its white to pinkish fruits, open and displaying the bright orange seeds, it is singularly handsome. The flowers are white and more conspicuous than is usual among Evonymus. Similar in general appearance of foliage but a large bush rather than a tree is *E. yedoensis,* which has rosy to dull purplish fruits only opening sufficiently to

show the orange-colored seeds peering through the fissured valves. It has this advantage, however, the leaves turn a brilliant red in the autumn.

The vernacular name "Burning Bush" belongs properly to *E. atropurpurea,* a native of eastern North America and cultivated since the middle of the Eighteenth Century. It is a bush or small tree sometimes twenty-five feet tall but more often from six to twelve feet with deciduous leaves, dark purple flowers, hanging crimson fruits and scarlet seeds. Its habit is open, often straggling, but a well-fruited plant, the capsules suspended on long stalks and the scarlet seeds displayed, is handsome. The name "Burning Bush," however, would apply with greater accuracy to *E. planipes* whose fiery crimson fruits with orange-colored seeds are more brilliant and handsome than those of any other species. This is a bush from five to eight feet tall, of compact habit with ascending stems and broad, dark green leaves which become purple tinted in the autumn. The fruits, thick, massive and angular, each three-quarters of an inch across and borne in loose clusters, are suspended on slender three to six-inch long stalks. Laden with a multitude of fruits in October a bush from the near distance glows with intense scarlet like unto live coals of a charcoal fire. There is nothing more wonder-

ful in fruit among hardy woody plants than *E. planipes* which came to us from north Japan. A closely related species very rare in gardens is *E. oxyphylla,* distinguished by its small and perfectly smooth fruits.

A European Spindle-tree with broad, rich green leaves is the well-named *E. latifolia.* This is a wide bush or small tree sometimes twenty feet tall but more usually from eight to ten feet and as much through with red-purple branches and five-winged fruits, each three-quarters of an inch across, suspended on long thread-like stalks. When ripe the fruit is bright rosy red and bursting displays orange-colored seeds. In good soil this makes a fine specimen and hung with brilliant fruits in autumn is not to be denied its place in the front rank of ornamental shrubs. The oriental *E. macroptera* is very similar but has much larger wings to the star-shaped fruit. Related also is *E. sanguinea* with red-purple shoots, velvety green leaves which curl somewhat and become rich crimson-purple in the autumn. Of the twenty species and varieties of Evonymus, which it has been my good fortune to add to gardens, this and *E. lanceifolia* thrive best in the Arnold Arboretum.

More curious than beautiful is *E. verrucosa,* a densely branched, round-topped shrub from five to

eight feet tall with the young branches studded with wart-like excrescences. The Strawberry Bush *(E. americana)* has little to recommend it although it has been cultivated since 1683. It is upright in habit, sparingly branched and seldom more than five feet tall. The fruit, which is red, is curious for it bristles with prickly warts. A very good plant for clothing odd corners is the North American *E. obovata,* a deciduous species of trailing habit and rarely more than a foot high with dull green leaves broadest above the middle, greenish purple flowers and crimson prickly fruits with scarlet seeds. In a wild state it frequents damp places but in cultivation is in no sense fastidious, thriving in dry spots and even under large trees. Prostrate in habit it roots freely as it spreads and makes quite a good groundcover for which purpose it ought to be more generally used.

A pleasing little deciduous or partially evergreen shrub is *E. nana,* native of western Asia and remarkable in having the leaves arranged both alternate and opposite on the stems, a departure from the general rule in Evonymus. It is of spreading or procumbent habit growing from one to three feet tall with slender stems and narrow Rosemary-like dull green leaves. The inconspicuous flowers are brown-purple; the fruit is pink and the seeds have the usual orange-

colored jacket. Being quite hardy, this plant has a decided use since it can be conveniently planted wherever low shrubs are needed. There is an equally hardy variety *(Koopmannii)* of sturdier habit and broader leaves which came from the mountains of central Asia.

For those who garden near the sea where a mild climate prevails the evergreen *E. japonica* is a valuable plant. Of dense leafy habit it is splendid for hedges standing clipping exceedingly well. Being by nature a maritime plant, it is particularly well suited for shore gardens withstanding in a marked degree both strong winds and salt spindrift. It is a much-branched bush or small tree growing from ten to twenty-five feet tall with lustrous green leathery leaves usually broadest above the middle, blunt at the apex and narrow at the base. The fruit is small, pinkish with pale orange-colored seeds and is borne erect on rigid stalks. It is a most cheerful and useful broadleaf evergreen and where it is hardy thrives most successfully in poor sandy soils. In some places it suffers from Mildew and needs to be sprayed with solution of sulphur. This Evonymus has been in cultivation in western gardens for more than a century and a prime favorite with the Japanese for we know not how long. This has resulted in a num-

SPINDLE-TREE, EVONYMUS LATIFOLIA

ber of sports, some with broader, others with narrower leaves and some with white and yellow variegated foliage. For those who like freaks with oddly marked foliage var. *latifolia-variegata* with broad white, and var. *ovata-aurea* with rich yellow, margined leaves are good plants; another variety *(aurea)* has the centre of the leaf bright yellow and only a marginal line of dark green.

Much more hardy is the Chinese *E. patens,* sold by many nurserymen under the erroneous name of *E. Sieboldii.* In the Arnold Arboretum this plant suffers during the winter and is not satisfactory but at Bristol, Rhode Island, there is a hedge of this plant fully one hundred feet long, five feet through, perfect in every way and a worthy object lesson to the usefulness of this Evonymus. At babyhood it creeps somewhat and emits roots freely from the stem but soon deserts this habit for an upright form of growth, developing into a broad-spreading bush from six to eight feet tall, but unless clipped it remains loose and straggling. The leaves are leathery, bright green, broad oval to obovate in shape, each from two to three inches long and from one to two inches wide, blunt or pointed at the apex and retained on the shoots for several years. The fruit is pink, globose in shape, and the seed coat is orange-red. It is one of

the plants introduced first into this country in 1861 by Dr. G. R. Hall and, like others we owe to this good man, has been too much neglected. Growing well in the most ordinary soil, easily propagated by cuttings and splendidly adapted for hedge-planting, this most useful plant is destined to be of great value to American gardens.

In Massachusetts the common Ivy is not hardy and the finest substitute we have is the evergreen Bittersweet *(E. radicans)*. All round this is the best exotic broadleaf evergreen hardy in New England where its different varieties may be advantageously used for many purposes. On Long Island and around New York this Evonymus suffers badly from scale-insects and on this account its planting is not recommended but in and around Boston and in New England generally, where the summers are not so dry, it is little troubled by this pest. The landscape men now appreciate this evergreen and many a house, wall and out-building clothed with it stands out in winter cheerful objects of dark lustrous green.

This Evonymus is a creeping plant, rooting as it spreads over the ground and forms a dense carpet. It will climb to the tops of trees forty feet tall and readily covers stone walls and wooden buildings. To cement and hardy brick it does not readily cling

and needs training and keeping in place by means of strong copper wire. For the north and west fronts of houses it is especially valuable and with judicious clipping soon makes a curtain, green and restful at all seasons of the year. This plant is worth taking a little trouble with since it so greatly enhances the appearance of everything it clothes. It can also be used for edging paths and borders, taking the place of Boxwood, which is much less hardy. For this purpose a couple of strands of wire set low help the formation and, of course, frequent clipping is necessary. The plant grows quickly and a pleasing edging is soon formed. In a young state the leaves are marbled with dull white but this stage soon gives place to another with bright green foliage. A pleasing form with small, pointed leaves marbled and passing to bright green is the var. *acuta,* which I introduced from China. This and the typical plant are excellent groundcovers under deciduous trees. More handsome than my form is the var. *colorata,* whose leaves are tinted rich red-purple in late fall and throughout the winter. This plant was introduced by the late Frank N. Meyer and has been distributed by the Department of Agriculture. It is destined to be widely planted as it becomes properly known. There is also a pretty form *(foliis-variegata)* with

leaves marked by a broad marginal band of pure white.

An excellent plant for the rockery is the charming var. *minima* which was raised from seeds collected in northern Japan by Professor Sargent in 1892. This has slender stems densely clothed with tiny ovate leaves, each from a quarter to a half inch long, crenated along the margin, dull green with the principal veins prominent on account of their paler color. When grown against rocks, tree trunks and low stone walls it will cling freely by roots emitted from the stems and soon forms a pretty drapery; when support is lacking the slender stems cling together and form a neat dense-hummock or irregular pyramid. Similar but with even smaller leaves is var. *kewensis*.

All of these are juvenile forms or conditions which do not bear fruit, but sooner or later from the typical creeping form strong lateral branches arise which have larger leaves and bear erect axillary clusters of white flowers and white often flushed with rose-color, globose fruits which display orange-yellow seeds. This condition has been propagated by cuttings and is known as var. *Carrierei*. It does not climb but is admirable as a bush near the front door and for making low hedges. There is a form of this *(Silver Queen)* with leaves each two and one-half inches long and

more than one inch wide and conspicuously variegated with white. More vigorous than Carrière's form is another variety *(vegeta)* with roundish leaves and a bushy habit. This flowers and fruits abundantly; its free-growing shoots emit roots and the plant may be used as a climber or as a bush. On and among boulders this variety is seen to excellent advantage.

EPILOGUE

HOW AND WHERE TO GET THE ARISTOCRATS

IT is no new thing for me to be told, that it is unfair to whet the appetite for plants that are unattainable. I deny the impeachment now, as many times before. The aristocrats I tell of are attainable, though not all at the moment are available. Sometimes my friend, the nurseryman, assails me with such a remark as, "What is the use of stocking up with plants people do not know and, in consequence, will not buy?" On the other hand my friend, the amateur, bemoans the fact that the rare things he would have cannot be purchased. There is something to be said for both of their complaints, though I fear both are often guilty of undue haste in arriving at conclusions. On one hand there *is* a greater demand for first-class plants than the average nurseryman either admits or knows. On the other there *is* a greater variety available than the average amateur knows. That these statements are true I can bear witness, for I have on file the plants—tree, shrub and vine—carried by some two hundred nurserymen in this country. That there is a demand, an ever increasing demand, for aristo-

crats is evidenced in the fact that each day of every week and month I answer inquiries as to where this and that can be obtained. Frequently I must acknowledge that certain plants are not available in the trade of this country, but they may be obtained from Europe. But, looking backward a decade it is gratifying to note the improvement in nurserymen and nursery stock. Hundreds of plants unobtainable ten years ago are available today. Each year sees a forward step in variety. Of course, we are only at the beginning of the game but it is well to remember that all our wants will never be wholly satisfied.

Now, first and foremost in peopling gardens with aristocrats, means must be found by nurserymen to acquaint the public of the material they carry. Their catalogues and advertising should do this, but unfortunately, the catalogue is seldom exhaustive and usually both it and the advertisements could be much more informative, and they can be improved. Nurserymen should seek to discover what their customers —the gardening public—want. Ordinary standards of supply and demand are insufficient, in fact are quite inadequate. Some means of getting together and exchanging ideas must be found. Books and magazine articles assist, but they are not enough. They help to quicken—often create—a demand, but

they do not satisfy it. Acception of substitutes will never further the course—only retard it. On the contrary, rigid insistence on the desired plant and no other will sooner or later bear fruit. The garden lover, likewise must not suppose that any one nurseryman can supply all the better quality plants he would grow. This is neither practical nor possible. Plants are living things, have likes and dislikes as each and everyone who gardens soon learns. Nurserymen, yes and expert, suffer in the same degree, and wisdom forbids any attempt to become universal purveyors. Those in quest of the best must search in divers fields and in many catalogues. It takes time, but there is a fascination therein, and the sport of the thing awakens a new interest. A few postage stamps will bring catalogues from near and far, and these become a reference library in themselves. You will claim it increases the labor of gardening and consumes much time. Of course it does, but it adds vastly to the pleasure when the elusive comes safely into our possession. It enriches our gardening experience. It gives individuality to the plants in the garden. We should tenant our gardens even as we furnish our houses, piecemeal not wholesale. In securing pictures or art objects for our homes no one of us expects to walk into any single shop and satisfy

his complete desires. Many shops must be visited and much time spent in the quest. The same is true in furnishing our gardens with the best of plants. Things worth having are always worth searching for and waiting for.

The automobile brings the countryside before the ken of city dwellers. To the garden lover it has a special use. By its aid he can visit distant friends' gardens and enjoy the flowers of the roadside and woodland. And he can readily visit the nurseries in convenient radius. He can call when plants are in bloom, appraise their worth, have them marked for his own garden. In autumn and spring he can convey them quickly from the nursery to his garden. But, the paramount thing is that by so doing the garden lover quickly acquires comparative knowledge, learns to know plants, learns who succeeds with this and that. In short, he learns to buy wisely and well. Nurserymen welcome such visits; their gates are open welcomingly at all seasons. There need be no more hesitation in visiting and inspecting nursery stock than there is in looking around a department store. Moreover, a mutual love of flowers is common to amateur gardener and nurseryman, and pleasant hours may be spent and often friendships formed. Such touring and such contacts are the best, the sim-

plest and most effective means of getting really acquainted with plants and finding out where they are to be obtained.

The nurseryman, too, must get around, not only with his brethren in the trade but to the public gardens and arboreta. If he is to keep abreast of the times, if he is to be a leader in his profession, if he is to enjoy the custom of better clients, he must keep himself informed, up to date. Institutions which continually import plants from foreign lands and test them out should be a Mecca to every enterprising nurseryman. There he can make his own appraisals before securing stocks.

By travelling afield and seeing things and by interchange of thought, knowledge is gained and enthusiasm bred. There is much more in making a garden than mere ability to sign a check. Aristocrats are no more difficult to grow than plebeian types. More difficult to come by, true, but in their quest the sporting instinct is fired and ultimate possession brings satisfaction rare in mundane affairs.

I had written, I thought, the last word of this epilogue and sat musing ere I wiped and laid aside my pen. My thoughts wandered afar. I lived again the enjoyed travels in many lands, and beauteous blossoms wove themselves about me. I saw gardens

throughout the length and breadth of this fair land, richly dowered in all that is best and most suitable to its varied climates. There was leaf, flower and fruit, each in its season abundant, of quality unrivalled. The country had entered into its kingdom, floral beauty embellished every home. 'Twas a pleasing picture, a dream, but a dream that some day will be an accomplished fact. If we build wisely, permanency is assured. A good example is infectious and whoever starts a garden invites emulation. Man must have some hobby outside of the common round, the daily task, otherwise his life is not well-balanced. And, when for some reason or another he retires from active participation in the routine of business, he is like a ship without a rudder if he has no hobby to which to turn.

A man must have two separate sides to his head and sufficient to healthily occupy his mind and body when his ordinary business in life draws to a close. Long ago gardening was acclaimed the greatest of human pleasures, the greatest refreshment to the spirit of man. And those who plant a garden, best know this wisdom. To get closely in touch with nature, to watch the procession of seasons, to note how change, wondrous change, proceeds, and how natural laws govern the bursting of bud, unfolding

of flower and ripening of fruit is wholesome and leaves no time for ennui. To plant some flower and watch it develop to perfection is a fascinating pastime. Moreover, it is creative and rich in object lessons to youth and maturity. As nations come to culture, love of the beautiful prevails. There is nothing more beautiful than a flower and no flower so sweet as that raised by our efforts in our own garden, be it never so small.

I have written of things that interest me and of the plants I love in the hope that others will find interest and instruction in what is set down. My appeal is to no narrow public but to all who garden and would garden and to those who cater to our garden needs. My theme may be summed up in a phrase, "The best there is for our gardens."

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